THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The new year opens with the iron trade still under the pains of prosperity and destined to be hobbled for many weeks by the breaking down of transportation agencies. There has been little in the developments of the week to suggest the closing of a year's business Buying has gone right on and the iron trade has crossed the line under a pressure ordinarily found in the active consuming period of the year. Not that the buying is what it was some weeks ago, but the comparison is with the quiet time that usually precedes inventory. The coke embargo upon blast furnaces has reached an acute stage. In the Chicago district 11 furnaces were idle early this week, in the Mahoning and Shenango Valleys 20, in the Pittsburg district 12, of Southern Ohio 3, several in Virginia and Alabama, in Cleveland 2, while in other districts there is a like cutting off of production by banking for a portion of the week. The locomotive works, which are now driven to their utmost, must be looked to for relief. The market activity of the week has been shared by all lines except the few affected by the season. Pig iron has advanced, Bessemer, foundry and gray forge selling from 25 to 50 cents higher. Buying of smaller quantities of Bessemer has followed the large contracts reported last week, and $16, Valley furnace, is now the basis for round lots, as high as $16.50 in the Valley being paid. Basic iron has advanced to $15.75, Valley furnace, Northern gray forge to $15 at furnace, and No. 2 foundry to $15.50 at Valley furnace. Southern furnaces that have maintained $11.50 at furnace for No. 2 followed the advance of the minority on Monday of this week, and now quote $12. Though foundries were supposed to have covered generally for the first half there is still considerable buying, some of it for the entire year, with indications that not a few are contracting to make sure of deliveries, rather than to cover contracts in hand. It was only so recently as 1899 that this sort of buying left the furnaces practically without new business through the following year. The steel situation is unchanged. Bessemer billets are sold at $27.50, Pittsburg, and the difficulties of independent finishing plants are not lightened. Steel supply rather than finishing capacity will be the key to the situation in several lines, notable sheets, for some months, and further importations may be expected. Wire rods have been active and higher and the recent sales at $32.50, Pittsburg, cannot now be duplicated. In the week 15,000 tons have been sold at Pittsburg, largely at $33, and some sellers now quote $34. This advance has strengthened the market for wire and wire products, in which the recent low prices are withdrawn, $2.10 for wire nails being now commonly asked. Jobbers made large contracts at the lower prices. Structural steel is still conspicuous and mills are adding large contracts weekly. In the Chicago district sales of close to 15,000 tons were made last week and extensive building operations will add to this in the near future. At Pittsburg a 24-story building calling for 15,000 tons will soon be on the books of the mills. An index to the steel situation is a contract for 100,000 steel axles placed by a Western buyer the past week; it points as well to the unparalleled business of the railroad and car shops. Coke has advanced 25 cents in the week or to $2.25 for Connellsville furnace coke. Most of the business for the first half of 1902 was closed, however, on the $2 basis.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Dec. 31.

The pig iron situation continues to increase in strength daily and further slight advances have been noted during the week. Sales of nearly 10,000 tons of Bessemer iron have been made during the week on a basis of $16 at the furnace or $16.75, Pittsburg, some of which is for delivery throughout the first half. For prompt delivery $17 to $17.25, Pittsburg, has been paid. Sales of 8,000 tons of No. 2 foundry iron have also been made at $16, Pittsburg, for delivery within the next six months and at $16.25 per ton for spot shipment. We also note the sale of 2,000 tons of gray forge for delivery up to April 1 at $15.75 per ton. Considerable Southern foundry iron has been sold in this market during the week for spot shipment at $16.15 per ton for No. 2. Consumers of all grades of iron are experiencing much difficulty in securing product ordered several months back and the United States Steel Corporation has a considerable tonnage of Bessemer undelivered, which was purchased for November and December. There are no Bessemer iron stocks in the Valleys at the present time and unless shipments from the merchant furnaces grow better there is danger of a number of steel plants being compelled to shut down.

At the present time fully a dozen furnaces in this district and the Valleys are banked on account of the failure of coke shipments. Several furnaces of the large steel producers in this city are banked and this is seriously interfering with the operation of steel plants. Thus far the steel plants have not been compelled to shut down, but there is every indication that such will be the case before the end of the week, unless the furnaces are immediately placed in operation.

For the close of the year the past week has been extremely active in many lines. There has been good buying of wire rods by independent wire and wire nail interests, the sales of the week amounting to nearly 15,000 tons. Prices have again advanced to $33.50 and $34 per ton, and steel producers have their product nearly all taken, for the first three months of the year. The advancing rod market is also having its effect on the wire and wire nail trade and prices are stiffening up somewhat, as the profits to the independent manufacturers on wire nails at $2 per keg based on $33 rods is very small. Jobbers of wire and wire nails, believing that the market has reached bottom have also been buying heavily during the week, filling up depleted stocks and preparing for the spring demand which promises to be large owing to the volume of building already under way all over the country.

Few of the mills in this district will shut down over New Year's Day owing to their crowded condition and none will be closed this week for the purpose of making annual repairs.

No less than 250,000 tons of coke are piled in the Connellsville region and at ovens in the coke regions outside of the Connellsville district. Many ovens in both districts have been compelled to shut down temporarily owing to the constantly increasing stock piles. Connellsville furnace coke for delivery during the first half of the year has been advanced to

$2.25 per ton, but this will not affect many furnace operators for the reason that nearly all the six months contracts were closed fully a month ago. Spot shipment coke continues to command premiums ranging from 25 to 50 cents per ton.

Never in the history of the iron and steel business of this country has a new year been ushered in so auspiciously. Last year at this time the market was on a low basis, and consumers were awaiting bottom prices before placing orders. Just the reverse has been true in the past few weeks. Consumers have all been anxious to cover for future requirements with the result that the market is in a very strong condition, with the possible exception of merchant pipe and casing and the lighter gauges of black sheets. The commencement of operations at a number of independent pipe mills has somewhat weakened the pipe market, concessions being freely offered to secure business, while in sheets this is considered the slack season generally.

PIG IRON.—The curtailment in the production of all grades of pig iron continues owing to the banking of furnaces in the Mahoning and Shenango Valleys and in this district. The coke situation during the past week was much the same as in the week before and although some relief has been promised by the railroads it is not yet apparent. Bessemer iron continues to advance in price and no sales were made during the week below $16 at the furnace. Other sales for prompt shipment have been reported as high as $16.25 Pittsburg. The sales of the week amount to about 10,000 tons. Forge iron is also stronger and one sale of 2,000 tons for future delivery has been reported at $15.75, Pittsburg. Owing to the inability of foundrymen to secure satisfactory deliveries of iron, considerable Southern iron has been purchased for prompt shipment at $16.15 per ton, Pittsburg. The proposed tariff of 15 cents per ton on slag and furnace waste which the railroads intended charging the furnacemen on Jan. 1 will not become effective until Feb. 15. After a discussion of this tariff rate at the meeting of the Western Pennsylvania and Eastern Ohio freight traffic association last week it was decided to postpone the enforcement of this tariff at the request of the furnace operators. We revise our quotations as follows:

Bessemer, Valley	$16 00 to 16 50
Bessemer, Pittsburg	16 75 to 17 45
No. 1 Foundry	16 75 to 17 00
No. 2 Foundry	16 00 to 16 25
No. 3 Foundry	15 75 to 16 00
Gray Forge, Pittsburg	15 50 to 15 75
Chilled Basic, Valley	15 00 to 15 25
Chilled Basic, Pittsburg	15 75 to 16 00

STEEL.—The wire rod market was extremely active during the past week, independent manufacturers of wire and wire nails covering their requirements for the first quarter. The sales of the week amount to about 15,000 tons at prices ranging from $32.50 to $33.50 per ton. Since these orders have been placed manufacturers of rods have advanced prices on all but large lots to $34 per ton. Bessemer billets for prompt delivery continue high and small sales have been made during the week at $27.50 to $28 per ton. There is practically no buying for future delivery for the reason that consumers believe that prices will decline somewhat during the next few months.

FERRO-MANGANESE.—We continue to quote domestic ferromanganese, 80 per cent, at $52.50 per ton, delivered at buyer's mill, although foreign manganese continues to be offered at $50 per ton. We quote spiegeleisen at $26.

SPELTER.—With the recent advance in ores to $34 per ton there is little likelihood of the spelter market declining until ores become cheaper at least. Prime Western grades are quoted at 4.25c to 4.30c, Pittsburg.

MUCK BAR.—Small sales of muck iron have been reported during the week at $29.25 to $29.50 per ton.

SKELP.—A fair demand continues for both iron and steel skelp and we quote grooved and sheared iron skelp at 1.80c to 1.85c and steel at 1.75c for both grooved and sheared.

RAILS AND TRACK MATERIAL.—Within the next few weeks the rail mill of the Ohio plant of the National Steel Co. at Youngstown, O., will again be placed in operation. Standard section rails continue unchanged in price and we make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $42; 12 pounds, $38; 16 pounds, $35; 20 pounds, $34; 25 to 40 pounds, $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—The plate market grows stronger daily and mills are gradually accumulating considerable business. Prices remain unchanged as follows: Tank plate, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox. A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—The mills in this district continue to carry from two to three months' business on their books and deliveries are very bad owing to the freight congestion. Our quotations are unchanged as follows: Common iron bars, 1.50c, Pittsburg, for Western delivery, and 1.55c, Pittsburg, for Eastern delivery; refined iron bars, 1.75c and upwards; Bessemer steel bars, 1.50c; open-hearth, 1.60c; plow beams and cultivator beams, 1.50c, net; channels, angles, zees and tees, Bessemer under three inches, 1.60c; over 3 inches, 1.70c. Hoops and bands are quoted at 1.90c, full extras.

PIPES AND TUBES.—The outlook for the first three months of the year is particularly bright, although independent manufacturers continue to make concessions on merchant pipe and casing. Discounts to consumers, Pittsburg, in carload lots are as follows:

MERCHANT PIPE.

	Blk. Per cent.	Galvd. Per cent.
⅛ to ⅜ and 11 to 12 inches	61	48
½ to 10 inches	68½	56

BOILER TUBES.

Steel.

	Per cent.
1 to 1¼ inches	47½
2½ to 5 inches	65½
1¾ to 2¼ and 6 to 13 inches	60

Iron.

	Per cent.
1 to 1¼ and 2½ inches	43½
1¾ to 2¼ inches	43
2¾ to 13 inches	53

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3¼ to 4 inches	63
4½ to 12¾ inches	65

SHEETS.—Independent sheet mills are eagerly taking orders for the lighter gauges of sheets on a basis of 3c for No. 28 gauge in large lots. Considerable business continues to be placed on this basis. Deliveries on the heavier gauges are still from two to three months behind. Black sheets in carload lots to consumers are held as follows: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets are quoted at 70 and 5 off in carload lots; less than carload lots, 70 off.

STRUCTURAL MATERIAL.—We have been advised that the mills in this district are practically filled up through the month of April, but despite this crowded condition the amount of new business that is being placed is enormous. The contract for the structural material required in the 24-story Farmers' Deposit National Bank building to be erected in this city will shortly be placed and calls for nearly 15,000 tons of material. Quotations remain unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—There has been a noticeable stiffening up in the wire and wire nail market and most contracts for wire nails are now being closed on a basis of $2.10 per keg in carload lots. The advancing rod market has already had its effect on wire and nails, and recent heavy buying of wire and wire nails has greatly helped to prevent lower prices. We revise our quotations as follows: Single carloads of wire nails to jobbers at $2.10 to $2.15 and less than carloads at $2.20 to $2.25; plain wire, carload lots, is quoted at $2.15 to $2.20 to jobbers and $2.25 to $2.30 to retailers; painted barb wire, $2.60 in carload lots to jobbers, and 2.70 to retailers; galvanized barb wire, $2.85 to $2.90 in carload lots to jobbers, and $3 to retailers. Cut nails are quoted at $2.05, Pittsburg,

in carload lots, and $2.10 to $2.15 in less than carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—A large tonnage has been placed in shafting for delivery during the first half of the year and the market has strengthened considerably. Prices on both carload and broken lots have been slightly advanced. For the coming cotton season the following prices have been made on cotton ties: In lots of 10,000 bundles and over, 80 cents per bundle; less than 10,000 bundles and over 2,000 bundles 83 cents per bundle; for 2,000 bundles and less, 86 cents per bundle. All prices are quoted at mill, Pittsburg, full freight added to place of delivery. These prices are for delivery up to April 1, for preferred delivery up ½ cent extra per month is charged. We revise quotations as follows: Turned, cold rolled and ground shafting, 60 per cent off for car lots and 55 per cent off for less than car lots; tire steel in carload lots and over, 1.60c; less than carload lots, 1.75c to 1.80c. Toe calk is sold at 1.70c, in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quality.

OLD MATERIAL.—A good demand is reported for old material and the market shows the same strength as in other lines. We make the following quotations, gross tons: Heavy melting stock, $17 to $17.25; low phosphorus melting stock, $18.25 to $18.50; steel rails, $17 to $17.25; busheling scrap, $13.50 to $14; No. 1 wrought, $17.25 to $17.50; iron rails, $23 to $24; cast borings, $8.25 to $8.50; cast scrap, $14 to $14.25.

COKE.—The total production of the Connellsville region for the past year is estimated at from 11,500,000 to 12,000,000 tons, breaking all records. The production for the week ending Saturday, Dec. 21, was estimated at 232,528 tons, a falling off of more than 6,000 tons from the production of the previous week. The decrease in the shipmnts from th region amounted to more than 2,000 cars as compared with the previous week. Connellsville furnace coke for delivery within the next six months is quoted at $2.25 per ton and foundry at $2.50 to $2.60 per ton. Outside furnace coke is held at $2 per ton and foundry at $2.25.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
934 MONADNOCK BLOCK, Dec. 31.

There is every prospect that for the first three months of the new year the production and consumption of iron and steel in this territory will be seriously curtailed. The deplorable state of affairs reported last week is more accentuated, if anything, this week, and manufacturers engaged in the metal industries view the immediate future with foreboding. Eleven local furnaces are now out of blast, one large seller of pig iron stating that it expected all its furnaces to shut down this week. This condition, coupled with the fact that the majority of furnaces are now refusing orders for delivery within the first six months of the year, and that it is almost impossible to get spot iron anywhere, presents a very gloomy prospect for those consumers who are in the habit of buying pig iron on the hand to mouth policy. What the outcome will be it is difficult to predict, but it is certain that never before were mills and furnaces so seriously crippled in getting out material.

All manufacturers and jobbers unite in saying that buying this month has exceeded the tonnage booked in the month of December in any previous year, and the inquiry on new business is in as great volume. Probably the most important order that has been placed this week was that of a large Western car builder for 100,000 steel axles which went to Pittsburg. There have been some good sized contracts for pig iron taken by Southern furnaces, mostly for late shipment. Bars are also in great demand, but it is impossible to get delivery within four months. Some of the Southern furnaces have advanced prices 50 cents a ton, accompanying the notification with the statement that they can take no more business for delivery within the first six months of the year. Some Northern furnaces have also advanced prices 25 to 50 cents a ton, but they have no iron for sale. Sellers of structural steel report contracts taken during the past week, aggregating 14,000 to 15,000 tons.

PIG IRON.—Transactions during the week have been confined almost entirely to late delivery orders, the largest order of the week being for 3,500 tons, which was secured by a Southern furnace. It is practically impossible to get spot iron, and sellers that have it can easily get from $1 to $3 a ton higher than quotations. Tennessee furnaces have advanced prices 50 cents a ton, and have notified their agents that they can handle no more business for delivery in the first six months of the year. Eleven local furnaces are now out of blast, and more may follow. One large seller expects all its furnaces to shut down this week. Some Northern furnaces have advanced prices 25 to 50 cents a ton, but as most of these have no iron for sale, the increase cannot be said to have affected the market. We revise our quotations as follows:

Lake Sup. Charcoal	$18 50 to $19 00	Southern Coke No. 4	$14 15 to $14 90
Local Coke Fdy. No. 1	16 00	Southern No. 1 Soft	15 65 to 16 40
Local Coke Fdy. No. 2	15 50	Southern No. 2 Soft	15 15 to 15 90
Local Coke Fdy. No. 3	15 00	Southern Gray Forge	14 15 to 14 90
Local Scotch Fdy. No. 1	16 00	Southern Silveries	16 15 to 17 65
Local Scotch Fdy. No. 2	15 50	Jackson Co. Silveries	17 00 to 17 50
Local Scotch Fdy. No. 3	14 50 to 15 00	Ohio Strong Softeners	17 00 to 17 50
Southern Coke No. 1	15 90 to 16 65	Alabama Car Wheel	20 50 to 21 00
Southern Coke No. 2	15 15 to 15 90	Malleable Bessemer	16 50 to 17 00
Southern Coke No. 3	14 65 to 15 40	Coke Bessemer	18 00 to 18 50

BARS.—Plenty of orders are being offered, but few of the mills can handle more business for delivery in the next four months. Inquiry is strong and a period of active buying is expected after the holidays. As indicating the tremendous activity of car builders, a notable order was placed last week by a large Western concern, calling for 100,000 steel axles. We quote 1.65c for iron and steel, Chicago; out of store, 1.90c to 2c.

SHEETS.—Consumers of all kinds are specifying heavily on contracts and new business is gratifyingly large. Jobbers state that transactions this month have exceeded the aggregate tonnage of any previous December. We quote No. 27 black, 3.50c, and galvanized, 70 per cent to 70 and 5 per cent.

BILLETS.—There is no change from the report that we have made for several weeks past. It is next to impossible to get billets, and such transactions as are reported are for small lots, and are sold as a favor. We quote $31 to $33 for Bessemer billets, and $33 to $35 for open-hearth.

STRUCTURAL STEEL.—One seller reports business during the past week aggregating between 14,000 and 15,000 tons. The First National Bank of this city is having plans prepared for a large office building, which, it is estimated, will require about 10,000 tons of structural shapes. Mills are still contending with the car problem and deliveries are uncertain. On new business heavy sections of beams can be secured in four to six weeks; light sections and angles in three months; universal plates, six to eight weeks, and sheared plates in four weeks. We quote mill shipments, carload lots, as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; angles, 6x6 and under, 1.75c; over 6x6, 1.85c; plates, 1.75c, base; tees, 1.80c; zees, 1.75c; small lots from store, ½c to ¾c higher; beams and channels from store, ½c to ¾c per pound higher.

RAILS AND TRACK SUPPLIES.—There is no lack of business being offered, but as all the mills are practically sold up on standard rails these orders are invariably refused. Track supplies and light rails are in good demand, and on the latter mills are sold up for three months. We quote as follows: Standard rails, $28; light sections, $34 to $36, according to size; out of store, $40 to $44; splice bars, 1.70c to 1.80c; spikes, 1.95c to 2.05c; track bolts, and hexagon nuts, 2.80c to 2.90c, out of store, 2.90c to 3c; square nuts, base, 2.65c to 2.75c; out of store, 2.75c to 2.85c.

MERCHANT STEEL.—A good demand continues to come in from the manufacturing trade, and the indications are that there will be a greater consumption in the coming year than in that about to close. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.85c to 2c; open-hearth spring steel, 2.25c to 2.50c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.65c to 1.80c; cutter shoe, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 per cent to 10 per cent higher.

PLATES.—The local mill reports a number of orders, though the tonnage has fallen off some during the holidays. Our quotations follow: Tank steel, base, ¼-inch, 1.75c to 1.85c; flange steel, 1.90c to 2c; marine steel, 1.95c to 2.10c; firebox steel, ordinary, 2c to 2.10c; special, 2.25c and upwards. Jobbers are selling from store according to size, as follows: Tank steel, 1.90c to 2c; flange steel, 2.10c to 2.25c; marine steel, 2.40c to 2.50c; firebox steel, ordinary, 2.40c to 2.50c; special, 2.50c and upwards.

CAST IRON PIPE.—Buying of this material does not commence until spring, and outside of a few small orders, little new business is being placed. We quote as follows: 4-inch water pipe, $29; carload lots, f. o. b. Chicago; 6-inch water pipe, $28; 8-inch and larger sizes, $27; gas pipe, $1 per ton higher than above prices.

MERCHANT PIPE.—There is a good demand for boiler tubes and the movement from stock has been large. One jobber reports that December sales have been greater this year than in any previous year. There is little demand for merchant pipe, this being the dull season.

MERCHANT PIPE, RANDOM LENGTHS.

	Black Per cent.	Galv. Per cent.
⅛ to ¼ and 11 to 12 in.	59.5	46.5
⅜ to 10 inches	67	54.5

BOILER TUBES.

	Steel Per cent.	Iron Per Cent.
1 to 1¼ in.	40	35
1¼ to 2½ in.	47½	37½
2¾ to 5 in.	57½	47½
6 in. and larger	45	40

WIRE AND WIRE NAILS.—There is no diminution in the heavy buying that has characterized the past few weeks, and jobbers everywhere are making strenuous efforts to stock their warehouses for the spring trade, and before any advance in prices is made. The market is firmer. Nails are selling on the basis of $2.25 in small lots to the retail trade; painted barb wire, $2.70 to $2.80, and galvanized wire, $3 to $3.10.

COKE.—No relief in the coke situation has come since our last report, and the number of furnaces in this district now out of blast has been increased to 11 in the past week. All the local sellers have received instructions not to take any more orders, as makers are unable at the present time to say when they will be able to ship more than is now coming into this territory. Contracts for late delivery are being booked on the basis of $5.50, though spot coke easily commands 50 cents to $1.50 a ton more than this price.

OLD MATERIAL.—Most of the large consumers are out of the market, taking stock and transactions during the week were comparatively few in number. We revise some of our prices, and quote as follows:

Old iron rails	$21 00 to $21 50	Relaying rails	27 00 to 28 00
Old steel rails, 5 ft. and up	19 50 to 20 00	Old wheels	$16 50 to $17 00
Old steel rails, mixed	13 50 to 14 50	Heavy melting steel	14 00 to 14 50
		Mixed country steel	10 50 to 11 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$15 00 to $15 50	Steel Axles	$18 50 to $19 00
No. 2 R. R. wrought	13 25 to 13 75	Cast borings	4 75 to 5 25
Dealers' forge	13 00 to 13 50	Wrought turnings	10 00 to 10 50
No. 1 busheling	11 00 to 11 50	Iron axle turnings	12 00 to 12 50
No. 1 R.R. & mach. cst.	11 50 to 12 25	Steel axle turnings	10 50 to 11 50
Railway malleable	12 00 to 12 50	Stove plates	8 50 to 9 00
Country malleable	11 50 to 12 00	Old iron splice bars	16 50 to 17 00
Iron axles	21 00 to 21 50		

CLEVELAND

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Dec. 31.

No sales of ore have been made in this territory since the recent contracts of some of the independent companies for large amounts, but it is known that negotiations are pending with a concern in the Valley for the sale of 250,000 tons which it is expected will be closed in the next few days. While no definite date has been fixed for the meeting of the Ore Association, at which prices on old-range Bessemer ores will be determined, recent sales and those pending point to the general understanding that old rates will be maintained. No arrangements have been made so far for the transportation of ore sold, the matter of season rates and contracts being left open until the prices of ore shall have been determined. It is believed approximately the rates of the past season will prevail. There is some discussion of possible action at the meeting of the Lake Carriers' Association at Detroit looking toward the adoption of a demurrage clause that will give the owners some redress in case of unusual delays such as were experienced last summer.

PIG IRON.—The sales of foundry pig have been so heavy heretofore that the available supply remaining unsold through the first half is small. Only occasionally is any iron found for immediate delivery and on this the prices are about what the furnacemen are inclined to ask. On future orders some furnaces ask $16 and $15.50 in the Valley respectively. The car shortage is still very annoying and the coke supply is causing greater delays daily. One concern reports that whereas it needed 275 cars of coke daily it obtained 75, which is considered about the average. The River furnace in Cleveland was banked during the week and some of the plants in the Valleys which have been out of blast snice the first of December are still idle, waiting for osme relief. It was reported yesterday that the furnaces now out consist of two in Cleveland, 20 in the Valleys, three in Southern Ohio, 12 in Pittsburg at the Carnegie plants, all of which went out on Saturday, six in the Birmingham district and 11 in the Chicago district. Basic iron has been sold this week at $15.75 in the Valley in good sized lots, the contracts covering deliveries for the first quarter. Bessemer is quoted at $15.75 to $16.25, Valley, with the market strong. The published price of Southern No. 2 is still $11.50 at Birmingham, but no sales are being made at that price, while all of the contracting is now being done on a basis of $12 Birmingham, the Cleveland freight being $3.70. We quote the Cleveland market as follows:

Bessemer	$16 50 to $17 00	Scotch No. 1	$16 25 to $16 75
No. 1 Strong F'dry	16 25 to 16 75	Scotch No. 2	15 75 to 16 25
No. 2 Strong F'dry	15 75 to 16 25	Gray forge, Valley	14 50
No. 3 Foundry	15 25 to 15 50	LakeSuperior charc'l	18 00 to 18 50

FINISHED MATERIAL.—Some inquiries for steel rails came up yesterday that will result presently in sales of upwards of 2,000 tons to lines in this territory. Several good sized orders for structural shapes are about ready to be placed as well and the supply is being bought up much ahead of production. The steady increase in the ordering and the forced reduction in the production have made a very strong situation. Any talk of advances is quieted as much as possible by the larger concerns who are still adherents to the policy of conservatism. The Cleveland quotations are still 1.70c on beoms, channels and angles. The plate market is confessedly a little weak. Some of the larger concerns have about all they can take care of, while others are on the market looking for business. Sheared plates are off as to demand, while the prices are holding firm at 1.70c, as far as heard. Universal mill plates are sold up ahead and the demand is very heavy. Some talk has been going of a weakness in the bar trade, but this lacks foundation as the prices are firm and orders are being taken in excess of production. It is said that three mills have been shut down recently because cars could not be obtained for the transfer of steel from one department to another. Bar quotations are 1.58½ for bar iron; 1.58½ for Bessemer bar steel and 1.68½c for open-hearth bar steel. The demand for sheets is still excessively large and there is no relief for the users of medium gauges, which are still very short. Mill shipments are still made f. o. b. Cleveland at: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c with the usual extras for less than carload lost. The demand out of store is still heavy and dealers are anticipating an increase in the coming months and are making proper preparations. We quote in round lots from store: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3.10c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 25-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c. The above are for one pass cold rolled. For full cold rolled the extra is .10c. Galvanized sheets are in good demand at from 70 to 70 and 5 off list.

OLD MATERIAL.—Some effort has been made during the past week to advance the price on scrap, but this failed and the dealers have sold at old prices, although buying is not heavy, pending the January invoices. Considerable delay is benig experienced in making deliveries. We quote as follows, all gross tons:

Old steel rails, rolling mill lengths	$17 00 to 18 00
Old steel rails, short lengths	15 75 to 16 50
Iron rails	21 00 to 21 00
No. 1. railroad wrought	16 50 to 17 50
Mill scrap	14 50 to 15 00
No. 1. machine scrap	13 75 to 14 00
Cast borings	6 50 to 7 00
Grate bars	9 00
Sheet iron	9 00 to 10 00
Stove plate	10 00 to 10 50
Car wheels	15 50

CINCINNATI.

Dec. 31

If those in the iron trade have been surprised at the condition of business for the month of December they have been more than surprised at the condition during the last week of

the year. December is generally a time for buyers of raw and finished material to slow up a little. December this year has been an exception. Both early in the month and in the last week of the month the demand has kept up and orders have been coming in during the past week as generously as though it were an ordinary week instead of a holiday week.

Of course, all branches of the business have shown the effect of the approach of the end of the year to some extent, but an advance of 50 cents a ton by some of the Southern furnaces just announced coming on the evening of the next to the last day of the year is a commentary in itself.

Consumers of raw material have bought so largely of pig iron that many of the pig iron firms have expressed the belief that they had covered for the first half of the new year and possibly for the entire year. In spite of this, however, they are still buying and in the opinion of close observers some of them have more than covered their actual needs as shown by advance orders for their product so far received.

The transportation question is still the greatest cause of worry. Furnaces are complaining as loudly as ever at the inability of the railroads to supply them with the coke that they have bought and that is even in many cases loaded ready for being hauled to the furnaces. Melters of pig iron are upbraiding the furnaces for their slowness in getting iron to them, and the railroads for not being able to move cars of iron that are loaded. Buyers of finished material are scolding in inverse ratio to the size of their orders. An example of the inability of the railroads to get through the congestion that appears to have swamped them is shown in the fact that an order of bars was shipped from Cincinnati to Hamilton, O., a distance of 20 miles, hardly out of the city limits and on the sixth day after receiving the bill of lading and the bill for the goods the consignee wired to know why the goods didn't come and wrote that when he gave an order for iron bars he wanted them delivered. Concerns that are accustomed to discounting bills are paying them right along before the goods are received.

PIG IRON.—The announcement is juts made of the advance of 50 cents a ton by some of the Southern furnaces, these being the ones that have not been selling at the full price asked by the furnaces that advanced their price about ten days ago.

The demand for pig iron has been good and for delivery all throuhg the coming year. It has also been distributed pretty well through the list. Orders for No. 4 where early delivery was wanted have shown that there is little of the lower grades to offer and better grades have been readily substituted. Buyers have been paying 25 cents over the quotations of last week in order to get iron and the advance has really made itself before the furnaces agreed to it. It was a fulfillment of the prediction of a prominent iron handler in the correspondence from this point last week that the consumers seemed bound to put the price up themselves.

There is no such thing as promising delivery on pig iron. Buyers are giving their orders with the expectation that sometime during the coming year when they need the iron they will be able to get what they have contracted for. There is nothing in sight at the present time to indicate that there will be any increased production or that the furnaces will be able to catch up with their orders, though everybody expects that something will turn up to help out the situation. It has been expected that the top of the wave would be reached and this figure and that of the swinging of the pendulum too far have been overworked. As yet, however, the swing backward or the decline from the top of the wave have not made themselves apparent.

The rains and floods in the South have interfered with the operations of the furnaces to a large extent. Some of the ore beds are flooded and all of the out-door work has been seriously interfered with. Conservative interests have been trying to hold the market in check and have sought to keep it from being influenced by hysterics. Compared with last week's prices the following quotations show a net advance of 25 cents over the outside price. This, in the face of an advance of 50 cents a ton, is explained by the fact that some furnaces had previously made an advance and were selling at 25 cents over the outside price of the others. The advance of 50 cents by the remaining furnaces makes the outside price 25 cents higher. Following are prices f. o. b. Cincinnati:

Southern Fdy. No. 1	$15 25	to	$15 50	Gray Forge	$13 75 to $14 00
" " 2	14 75	to	15 00	Northern Fdy. No. 1	18 75 to 17 00
" " 3	14 25	to	14 50	" " 2	16 25 to 16 50
" " 4	13 75	to	14 00	Southern C.W. iron	18 75 to 19 50
So. Fdy. No. 1 soft	15 25	to	15 50	Malleable coke iron	16 50 to 17 00
So. Fdy. No. 2 soft	14 75	to	15 50		

FINISHED MATERIAL.—Buying has been going on during the last days of the year without any abatement to speak of. This buying is probably steadier than it would be were it not for the fact that deliveries are still slow and buyers are of the opinion that in order to do any good for themselves they will have to get in early. There is apparently not so much strength in the bar iron market as during the past few weeks. Deliveries can be made within a somewhat shorter time. The demand, however, holds up and there is no sign of a weakening in prices. The situation remains about the same with other kinds of material. With the exception of heavy plates, that can be had in about 10 days or two weeks, plates and sheets are hard to get. Steel bars cannot be had under a month or six weeks. An example of the delay in getting material from the mills came to notice this week that is positively ludicrous. A local iron store ordered for a customer a small lot of steel bars on Dec. 26, 1900. The sizes were such that the mill did not run them oftener than every few weeks and there was some delay. A delay was expected of a short time at least, but the bars were delivered on Dec. 3, 1901. Prices remain the same. Iron bars are 1.62c and steel bars the same. Angles are 2c with 2.10c charged by stores. Plates are 1.85c to 1.90c and 2c out of store. Sheets, No. 28, are selling at 3.80c out of store on the basis of 3.35c to 3.40c from the mill No. 12 blue annealed are 2.35c.

OLD MATERIAL.—The scrap market is quiet and nothing has taken place to cause any flurry among the large dealers. The demand remains good and will probably be livened up some by the strength in the pig iron market. Prices at Cincinnati are as follows:

Old No. 1 Wrought Railroad, net tons	$ 15 50 to 16 00
Cast Machine and Foundry, net tons	12 50 to 12 75
Old Iron Rails, gross tons	20 25 to 20 75
Old Steel Rails, gross tons	15 50 to 16 50
Old Short Lengths, gross tons	14 00 to 14 25
Old Iron Axles, gross tons	21 00 to 21 50
Old Iron Car Wheels, gross tons	16 25 to 16 50
Stove Plates, gross tons	9 75 to 10 00
Wrought Turnings, net tons	11 50 to 11 75
Cast Borings, net tons	5 50 to 6 00

As the result of a conference held last week between the officials of the Amalgamated Association and the American Steel Hoop Co., at Youngstown, O., the dispute over the scale of wages to be paid the finishers on the ten-inch and guide mills was satisfactorily adjusted. Hereafter the finishers will be paid the same scale of wages paid them before the 5 per cent reduction went into effect several months ago. The company officials asserted that a reduction should be made owing to improvements to these mills.

The Norwalk Steel & Iron Co., of Norwalk, O., projected some time ago, was incorporated at Dover, Delaware, last week with a capitalization of $1,000,000. J. A. Carnahan, of Canton, O., has been elected president; J. G. Gibbs, Norwalk, O., treasurer; J. Beatty, secretary, and E. E. Erikson, of Pittsburg, general manager and consulting engineer. The new company will build a tool steel producing plant equipped with two open-hearth furnaces of 30 tons capacity each and two 38-ton crucible steel floors, fully equipped with 95 crucible pots, which will give a capacity of 76 tons of crucible steel daily. The machinery equipment provides for eight steam hammers and two merchant mills. The main building will be 460 feet long and 100 feet wide. Several auxiliary buildings will also be erected to contain the electric lighting plant, power plant and offices. The erection of the buildings will be commenced shortly and the first steel will be produced about July 1.

The Alice and Spearman furnaces, located at Sharpsville, Pa., and owned respectively by Pickands, Mather & Co., and the Spearman Iron Co., were turned over to their recent purchasers this week. The Alice furnace was purchased several weeks ago by the Youngstown Iron Sheet & Tube Co. and the Spearman furnace by W. P. Snyder & Co., of Pittsburg. The Spearman furnace will hereafter operate on Bessemer entirely.

The Wheatland Rolling Mill at Sharon, Pa., resumed operations this week after an idleness of several weeks. The mill has undergone extensive repairs.

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PROFIT-SHARING IN THE STEEL INDUSTRY.

President Schwab's after-dinner speech before the Chicago bankers referred to a plan of profit-sharing which the United States Steel Corporation purposes to put into effect. Simultaneously with the publication of that speech we have the announcement that engineers on the lake vessels of the steel corporation are receiving a bonus of from $100 to $150 over and above their salaries for the past season, and that plans will be developed making this a permanent feature of the operation of the ore fleet, the bonus being in recognition of good records. The plan which President Schwab has in mind, presumably applicable to the various subsidiary companies of the steel corporation, is only vaguely indicated in his Chicago speech. Exactness in the use of terms is not to be expected in such an utterance, and the stenographic reports in the daily papers would no doubt have been altered had the speaker had the opportunity of revision. But this is the statement as reported in Chicago newspapers:

"The difficulty with these great combinations of capital is going to be to get people to manage them. Now, I believe that difficulty can be met, and the way we intend to try to meet it is this: It is the intention of the United States Steel Corporation to put every man in charge of a little branch of the business, even of a department of business, not on a salary, but on a percentage of the profits, which will be paid to him in cash and which he can invest in the securities if he wishes, and in that way get his individual effort upon his individual work. We don't believe that we get that from salaries, but we do believe that we can come as near making a man a partner in that direction as in any other way that has yet been devised, and, commencing with the first of the coming year, it is our intention to operate every one of our great departments on that basis."

In the same connection Mr. Schwab says that a computation made at Pittsburg of the average earnings of the employes, men and boys, at the largest works of the Carnegie Steel Co., taken as a fair specimen of what the American laborer is doing in iron and steel works "showed for eleven months of 1901 a daily wage of $3.99."

A bonus system, with special recognition of exceptional fidelity and skill, the highest wage paid to steel workers and laborers in the world, and in addition to these a relief and pension fund providing liberally for disability and old age, and for the families of men injured in works accidents—such a program will go far to counteract the feeling popularly entertained that the steel corporation's opposition to unions proceeds from a desire to secure low-priced labor.

The development into a system, of the thought which has been credited to Messrs. Morgan and Schwab, for the adequate recognition of conspicuous service will be as noteworthy a contribution to the settlement of the labor problem in steel manufacture as the premium and bonus systems have been in the economy of machine shops. The Carnegie Steel Co.'s prohibition of membership in the Amalgamated Association has marked that company among unions as one that denies men the right of combination for mutual protection. In the abstract we sympathize with this protest. As a matter of fact the high-wage and bonus practice of the steel corporation goes very far toward making the union a superfluity—that is, a union designed to "protect" its members against the alleged injustice and aggression of "corporate greed." It may be that in time there will come a differentiation in labor unions corresponding to the differences that now exist in the policy of corporations, but that time evidently is not yet. But it should cause some hard thinking that the companies that are able and willing to give their employes exceptional rewards have come into that very ability by cutting loose from the hamperings of the unions.

Some of the Industrial and Economic Features of 1901.

The crowding events of the year's history preclude any detailed enumeration of even their more striking features and a selection must be made for a brief resume of industrial affairs. The glowing tributes so freely paid a year ago to the glorious achievements of the 19th century were soon followed by the ominous indications of industrial friction. The growing commercial power of the nation lent strength to the prophecy that the world's financial center would be soon within the confines of the United States; and the successful floating of loans to England and Germany and the probability of a similar course being taken with Russia gave force to the fulfillment of this prediction early in the new year.

The foreign press has taken up the matter of the increasing menace of American trade abroad and legislators have found the topic much too important for any superficial treatment. The continental papers discussed seriously the trade invasion and its effect upon home industries and in several instances sent reliable representatives to examine into the causes for this commercial crusade. Solutions of all sorts were advanced —retaliatory tariffs, an economic alliance of the European continent, a permanent European customs commission to be entrusted with the task of providing for successive reductions of the duties and of establishing the closest relations between the European nations, etc. Perhaps the most notable of the suggestions along this line has been the advocasy of a change in the time honored free trade policy of Great Britain, a sentiment that has been growing at a rapid rate over there. Meantime the advantages of cheaper coal and iron ore, improved tools, innumerable labor-saving machines, continue to offer better value, lower prices and quicker delivery than the European competitor. The English concern over the situa-

tion has not been allayed and it has doubtless exercised a salutary influence upon manufacturing industries in the British isles. Prominent members of the Iron and Steel Institute, delegates from the ranks of the workers in various branches of industry, have visited the United States for careful investigation of conditions here and of causes for the upheaval of old world methods. Even at this, the outset of the new year, the technical and daily press has not lost its interest in the questions propounded at the opening of 1901.

The expansion of the Union Pacific to the control of the Southern railroad system was an event of great consequence in the financial world, but the closely following organization of the big iron and steel companies in February and March overshadowed for a time even the stupendous community of interest movement among the railroads. The new combination was viewed with more or less suspicion and in many quarters was considered to be a menace to the workman and a source of danger to the free competition of the independent manufacturer. These gloomy anticipations have not been realized and the statement made by one of the promoters that "it was not intended to create any monopoly or trust, but that it was possible that there would be such ownership or control as to secure perfect and permanent harmony in the larger lines of the steel industry" has very closely marked out the course of this immense aggregation of capital. The fear that such a combination would lead to the crushing of competitors and to the isolation of the one surviving company has not been realized as yet. Thus far the action of the great corporation has been to steady the irregular tendencies of the commercial mechanism. It too often happens that the succession of events is a boom followed by a glutted market, then a rapid fall in prices and ultimately stagnation and the shutting down of works. Any organization that is able to avert these fluctuations and maintain steady and remunerative employment for its workmen should be classed so far, at least, rather with the friends than the foes of labor.

The year which has seen gigantic combinations in all branches of trade has also had labor struggles of commensurate magnitude. The United Mine Workers early in the year sought an official recognition of the organization and the unwillingness of the operators to concede this request threatened to bring on a general strike in the anthracite region. The good offices of a practical pastor, Father Phillips, of Hazelton, Pa., prevailed and a basis for future harmony between operators and miners was attained.

Following closely upon the heels of a labor outbreak at Albany which tied up the street car service and involved some loss of life came the machinists' strike. The number of men taking part in this struggle at its inception has been variously estimated all the way to 50,000. The contest, which affected almost all the industrial centers, assumed the largest proportions in New York, San Francisco, Scranton, Chicago and Cincinnati. The questions at issue were not uniformly settled and in many instances the adjustment of shorter hours and increased remuneration was far different from the demands made elsewhere. The strike was minutely chronicled from start to finish in *The Iron Trade Review* and it is not necessary to recapitulate the course of events. The curtailment of hours of labor is a justifiable hope, but it does not necessarily follow that such a reduction means an increase in the number employed. It is more likely that it would be followed by stricter regulations of time, improved machinery and the quickening of the old, exacting discipline, greater capacity of new machinery with fewer attendants, and a more rigorous adoption of saving management and methods.

The machinists' strike was scarcely nearing the end when President T. J. Shaffer called out the members of the Amalgamated Association of Iron, Steel and Tin Workers. The conflict was waged with great determination, but it failed to elicit popular sympathy with the labor union, and the gains of the steel corporations eventually compelled the association to submit to less favorable terms than was possible at an earlier stage.

The recent conference between representations of capital and labor was the subject of editorial attention in these columns a week ago, and needs no further mention in this article.

The spectacular event of the year has been the Pan-American Exposition at Buffalo. The proximity of the tremendous energy available at Niagara enabled the designers of the "Rainbow City" to work out the electrical marvel of the opening century and the unique illumination of the tinted architecture will be a pleasing memory to the millions who beheld its magnificence. The exposition brought together a remarkable collection of material, and these exhibits pertaining to the mechanic arts were described in a series of articles in these columns. The succession of expositions in Chicago, Omaha, Buffalo and Charleston, with the undertaking on hand at St. Louis give some ground for the accusation that we are developing the exposition habit, and there are not lacking signs in the trail of these enterprises that the effort leaves some unpleasant effects. Such an energetic stimulation in the local field is naturally followed by a correspondingly acute depression. Aside, however, from the influence upon the local trades comes the query whether expositions pay. The Pan-American closed its gates with a deficit of some three million dollars. The backwardness of the opening and the disappointment of the earlier visitors told severely and did much to keep back the attendance. This exposition, however, shared with other like enterprises in the educational benefits conferred on the community; new processes of manufacture, new triumphs of art and science. A work of this kind should be valued rather by its worth to the people at large than any smaller section of those interested. In any event the eight million visitors undoubtedly expended in Buffalo a sum of money far exceeding the deficit.

Important changes in the government of nations have a direct influence upon the course of commercial relations, but the succession of the present king of England to the throne of Queen Victoria, caused scarcely more than a temporary interference with industrial conditions. Nor did a more abrupt rupture in this country bring any permanent disarrangement of trade. In the inventive history of the year should be recorded prominently the experiments of Marconi in wireless communication. The youthful inventor has successfully devised means of communicating from one ship to another without the agency of connecting wires, and this step promises to be of great benefit in navigation. Experiments now being made seem to indicate the possibility of greatly extending the distance over which messages may be sent.

Automobile records have been cut down to less than a mile a minute. Some of these exploits have been made on machines built in this country, and show that the American spirit is entering into a field that has been considered the property of the French mechanic.

Improvements in working conditions have made good progress and it is becoming less surprising to find employers recognizing the benefits to be derived from the comfortable environment of workmen. It is not to be expected that these will be undertaken generally from any purely altruistic motive, and it will also be expected that the fullest use of these opportunities will be made to advance the financial interests of the employers. But out of it all cannot but come a better knowledge of the more profitable conditions of employment and a more thorough realization of these facts underlying the mutual relationship of the employer and the employe. The former may shirk any moral responsibility other than the most elementary obligation, but even if he hold the workman as a machine he will do well to consider wages as the interest paid for the use of a very valuable piece of mechanism, and will see to it that the working conditions are favorable to free, accurate, speedy and well-lubricated operation. Of the other features of the year's progress: the pending settlement of reciprocal treaties with other nations; the significant gathering of the New York Chamber of Commerce in London; the tariff warfare with Russia; industrial depression in England and Germany; the exportation of American coal to France; the fall of the stock of the Amalgamated Copper Co.; the proposed expenditure of some 25 million dollars on an underground entry into Manhattan by the Pennsylvania railroad; improvements in tool steel; the investigation into the security of the Brooklyn bridge—these and many others of importance have done much to make 1901 an eventful year in the industrial history of the United States. R. I. C.

A. R. Fraser, secretary and treasurer of the Pressed Steel Car Co., Pittsburg, has resigned these offices. The office of secretary of the company devolves on A. H. Larkin of New York, a director of the company, and its New York counsel.

W. E. Reis, ex-president of the National Steel Co., has purchased a residence in New York and will remove with his family from New Castle, Pa.

SHARON STEEL COMPANY EXTENSIONS.

The Sharon Steel Co., of Sharon, Pa., and subsidiary companies, have under erection and projected additions to the plant that will cost no less than $5,000,000. The by-product coking plant under way will produce 1,200 tons of coke daily. Two new blast furnaces with a capacity of 700 tons daily have been projected making the daily output of iron about 1,300 tons. Four new open-hearth furnaces under erection will increase the total daily steel output from 1,000 tons to 1,500 tons. Altogether there will be 12 open-hearth furnaces. The tube mill now under construction will be 275 feet long and 325 feet wide; universal mill, 70x120 feet; skelp mill, 68x280 feet; hot bed building, 130x225 feet; stock house, 70x400 feet; reheating furnace building, 493x65 feet and shipping building, 70x380 feet. The sheet steel plant will contain 14 hot mills, 10 finishing mills and four roughing stands. The mill building will be 1,008 feet long and 105 feet wide with a galvanizing plant and warehouse 522x75 feet. There will be 10 heating furnaces in the sheet mill and five gas producers of the Duff type. The power will be furnished by a boiler plant capable of producing 2,000-h. p. The equipment for the skelp and tube mills will consist of a 48-inch universal mill driven by two 46 by 46-inch reversing engines. There will be 15 boilers ranged in batteries of two. From the universal mill the ingots will pass into three straight away skelp mills and thence to the hot beds and cooling tables. The tube mill will contain two lap weld and two butt weld mills. Pipe and tubing from ⅛ inch to 12 inches will be turned out. In the tube mill there will be 18 Duff gas producers and in the universal mill 12. There will also be six reheating furnaces in the universal mill. To the tin mill an addition 200 feet long and 70 feet wide will be built while an addition 40x70 feet will be built to the one end of the wire mill and to the other end an addition 200x70 feet.

W. B. Scaife & Sons Co., Pittsburg, was granted a New Jersey charter this week with a capital of $850,000. The company has operated in Pittsburg for many years, having plants on First Ave. and in Oakmont. The capitalization is necessary for carrying on the extensive business of the firm and also to provide for improvements under way and projected.

The Chicago office of the National Rolling Mill Co., Hartford, Ind., has been moved to more commodious quarters at 740 Marquette Bldg.

Col. D. L. Cockley, of Shelby, O., dropped dead on the evening of Dec. 26 while entertaining a party of friends. He was on the staff of Gov. A. S. Bushnell, of Ohio. In 1897 he received from Congress a special medal for gallantry in the battle of Waynesboro, Ga. Col. Cockley was one of the founders of the Shelby Steel Tube Co.

The Ontario government has passed an order incorporating the Algoma Tube Works, Ltd., with authorized capital of $30,000,000. The new works will be one of the Clergue syndicate enterprises at Sault Ste. Marie, Ont., and will manufacture wrought pipe and tubes under the Perrin patent.

A meeting of the directors of the Pressed Steel Car Co. was held Dec. 27 at the office in Pittsburg, at which three vacancies in the board were filled by the election of Judge J. H. Reed and T. H. Given of Pittsburg and H. E. Moller of New York. Judge Reed is the head of Knox & Reed of Pittsburg, director of the United States Steel Corporation, and president of the Philadelphia Co. of Pittsburg. Mr. Given is president of the Farmers' Deposit National Bank, the largest bank in Pittsburg, and a director in other companies. Mr. Moller represents the interest of large stockholders resident in New York. The President reported gratifying trade conditions, and said the company's output, which had been somewhat interrupted by failure to secure materials, owing to the recent switchmen's strike, had resumed its former proportions and conditions are now practically normal.

CLEVELAND MACHINERY MARKET.

The Cleveland Punch & Shear Works Co., of Cleveland has received an order for $25,000 worth of its standard punches, shears and rolls for the Structural Steel Car Co.'s new plant at Canton, O. The order will require several months to pass through the maker's shops.

The Reliance Machine & Tool Co. is very busy on its regular line of "Morgan" patent releasing die bolt cutters. Rush of business has not prevented the development of another addition to the company's list of threading machines and a pipe coil threading machine illustrated in last week's issue.

Early in January the Kilby Mfg. Co. will begin the installation of the new triple expansion engine at the pumping house of the Cleveland water works. It will be 60 feet high with a capacity of twenty million gallons daily. The firm also has in hand an order for some 500 twenty-four-inch pipe joints for the Risdon Iron Works, San Francisco. These are to be used in the pipe line for the water supply of that city.

David Round & Son, manufacturers of coil and cable chains, differential pulley blocks, etc., report a wonderful increase in business during the past year. Considerable new machinery has been added to the plant and the output has accordingly developed in a corresponding ratio, but present facilities are still inadequate to supply the demand should trade continue to build up at the rate of the past year or two. The company intends adding largely to the plant the coming year as the prospects for future business appear very flattering.

Albert F. Schroeder, who has been connected for eleven years with Otto Konigslow of Cleveland, is the organizer of the Globe Machine & Stamping Co. at Nos. 970 and 972 Hamilton st., of which mention was made in this column recently. This concern is doing a general machine shop business, manufacturing special machinery on contract, and will also make a line of hardware specialties which it will introduce very shortly. It also makes a specialty of manufacturing large punching and forming dies and has just entered some good orders in this line.

The Cleveland Axle Mfg. Co.'s works at Canton, O., recently burned, are rapidly being put in shape for resumption. Considerable new machinery has arrived, including two dynamos. The company will light the plant with its own machinery hereafter.

The Vulcanus Forging Co., manufacturer of railroad and special forgings, bolts, rivets, etc., is at present running full time; but the increasing volume of business is crowding the normal capacity of the plant and after Jan. 1 double time will be necessary. The firm is increasing the shop equipment; two 1½-inch rivet machines will be put in operation the beginning of the year and another solid die machine is to be added by the middle of January. These machines have been supplied by the American Machinery Co., of Willoughby, O.

The order book of the Upson Nut Co. is well filled and the prospects for the coming year apparently very good for a brisk business in bolts, nuts and carriage hardware. An addition to one of the buildings 50x200 feet, is almost completed and the increased floor area will afford some measure of relief to the crowded departments.

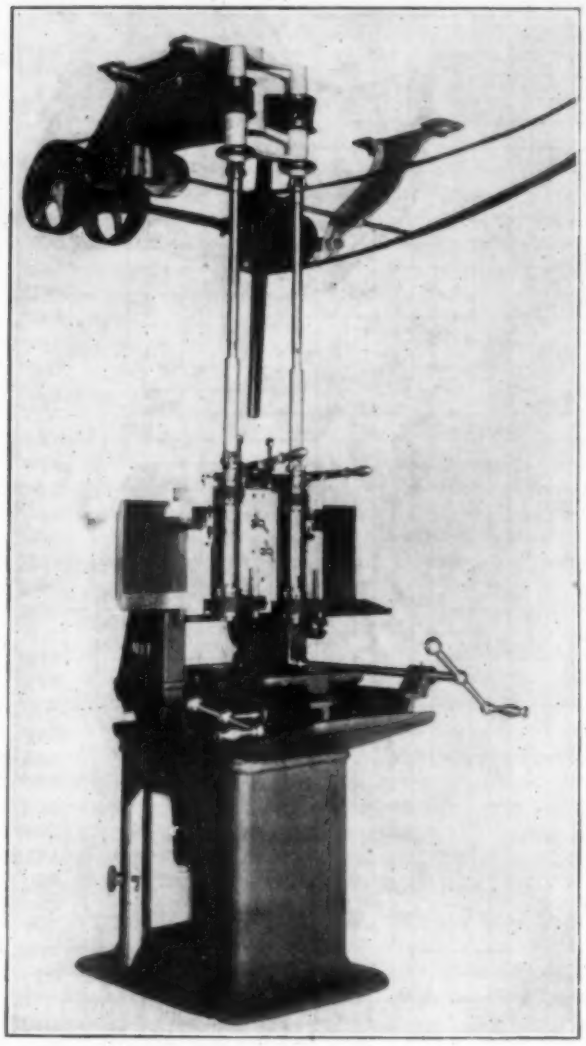
The Van Dorn & Dutton Co., general machinists and engineers, reports that the year's business is the largest ever done by the company. The firm is a large manufacturer of gearing, and the pressure upon this branch of the machine industry has necessitated the purchase of considerable new machinery. Among the recent purchases in this line is a large machine for planing bevel gears.

Hugh Kennedy, Thomas Kennedy, James Darragh, John Kelly, Frank W. Bradley and Frederick Ashbaugh, all connected with the Isabella furnace of the American Steel Hoop Co., at Pittsburg, resigned this week.

Some of the officers of the Carnegie Steel Co. were tendered a banquet last week by 100 employes of the Upper and Lower Union Mills at the Duquesne Hotel, Pittsburg. Henry P. Bope, W. W. Blackburn, and General Manager L. T. Brown were the officials in attendance.

A NEW PROFILING MACHINE.

This machine is built with one or two spindles, and the two spindle type is manufactured in three sizes to cover the entire range from delicate typewriter and pistol work to heavy cam cutting. A two spindle machine has the advantage that pieces may be roughed out by one spindle and finished with the other without resetting the work. The machine selected for illustration is the medium sized tool, No. 1 in the series 0, 1 and 2. The spindle slides are balanced and provided with a notched stop, by which work may be milled at different gauge-depths; and a micrometer adjustment of the spindles is also attached. The table has a sensitive movement and has a large oil groove around the edge, which keeps grit off the ways. Three T-slots are cut in the table for holding work and fixtures. All the gears and racks are split in order to take up wear and lessen the backlash. An oil reservoir is formed in the housing, from which oil is led to the cutters by two



NEW PROFILING MACHINE.

flexible tubes; the lubricant drains into a tank in the base of the machine and may again be pumped back to the supply tank in the upright. Attention may be directed to the large handles which are provided in all cases, as these give excellent working conditions and the motions of the table and cross-slide make it possible to follow any outline.

The most noticeable feature of the machine is the Wesson system of driving the spindles. This consists in connecting the countershaft direct from the spindle by means of a telescoping rod and universal joint. The mechanism gives every freedom of motion in all directions and on account of the length of the connection runs equally well in the most extreme positions. The universal joint is very compact; is made of machinery steel and is adjustable so that it can run dead true. The pins are tapered and are locked with check-nuts. There is a cavity in the center of the pin-block containing felt, which absorbs the lubricating oil, and by centrifugal force this oil is supplied to the pins which connect with the central oil hole. All the joints are keyed and secured by taper pins, riveted over at both ends. The countershaft carries two vertical shafts to give motion to the telescopic rods, a rear shaft with pulleys to drive the vertical shafts, and a three-speed cone pulley with friction clutch to belt to the line shaft. These shafts are all located in a single casting and the setting of the arrangement in position for the initial starting up of the machine is thus a very convenient operation and not nearly so difficult as one might be led to suppose at the first glance at the device. The hangers are supplied with large reservoirs containing non-fluid oil as a lubricant, which will run for weeks without attention, and is not thrown so readily from the rotating shafts. Provision is made for changing the direction of rotation of either or both spindles by sliding the rear pulleys sideways and reversing the belt.

The main dimensions of the machine illustrated are as follows: Working surface of table 15½x12 inches, with longitudinal movement of 22 inches; movement of cross-slide, 23 inches; distance between uprights, 16 inches; floor space required, 52x49 inches; domestic shipping weight, 2020 pounds.

The machine is manufactured by the Garvin Machine Co. of New York.

Imhauser Watchmen's Time Detector.

The temptation to neglect, which is strong in night watchmen, led long ago to the invention of mechanical checks to keep the watchman up to his work. Some of these had merit; others were cumbrous and costly, requiring the services of expert workmen to repair them; others could be tampered with by dishonest watchmen. E. Imhauser & Co., of 206 Broadway, have produced the watchman's improved time detector, which is used in the United States Life Saving Service and was the one contrivance in this line employed at the Pan-American Exposition. The Imhauser instrument was first made in 1869, the evolution of the interval is a clock with chronometer attachment and works fully jeweled. It is protected by a dust-proof cap and the outer edge is fitted with a safety knife blade lock attachment which cuts the dial every time the clock is opened or closed. Tampering with such a clock is out of the question.

There are 12 or 24 keys fitted to as many stations inside or outside the buildings guarded. Arriving at a station the watchman inserts the key in the keyhole and turns it to the right once. A figure is punched on the dial at the exact time indicated by the clock. A single stamping spring made from fine steel is used. It is attached to the cover and is completely independent of the watchman. In many clocks carried by watchmen there is a separate spring for each station. The tendency is for the springs to rust and stick together, so that all the stations are marked at once. Risk of fire is said to be so reduced when the Imhauser clock is used that the underwriters make an allowance for from five to ten points in favor of the insured. The manufacturers received the highest award at Buffalo.

Enlargement of N. & G. Taylor Co.

N. & G. Taylor Co., of Philadelphia, will move their general offices early in January to the Mariner and Merchant building, at the corner of Third and Chestnut Sts., where they are having roomy offices fitted up for their use. This change is necessary for their rapidly growing business in the enlargement and development of their tin plate plant, for their trade in open-hearth soft steel sheets for stamping purposes, and for their business in plate iron and steel. The company's minor offices will be transferred to the tin plate works on Tasker St., in Philadelphia, where they are already making important additions and building a very large warehouse, fully equipped with electrical elevators for the rapid handling of their product. The box department and the black plate department are also being enlarged, and another story added to this building. They are also enlarging their smelting works to meet the increased demand for their fine makes of solder, etc. They have occupied the property on Branch St. since 1845, and are now giving it up simply to obtain larger and more convenient accommodations.

The Mahoning Foundry & Machine Co., Youngstown, O., remembers its trade with leather card cases.

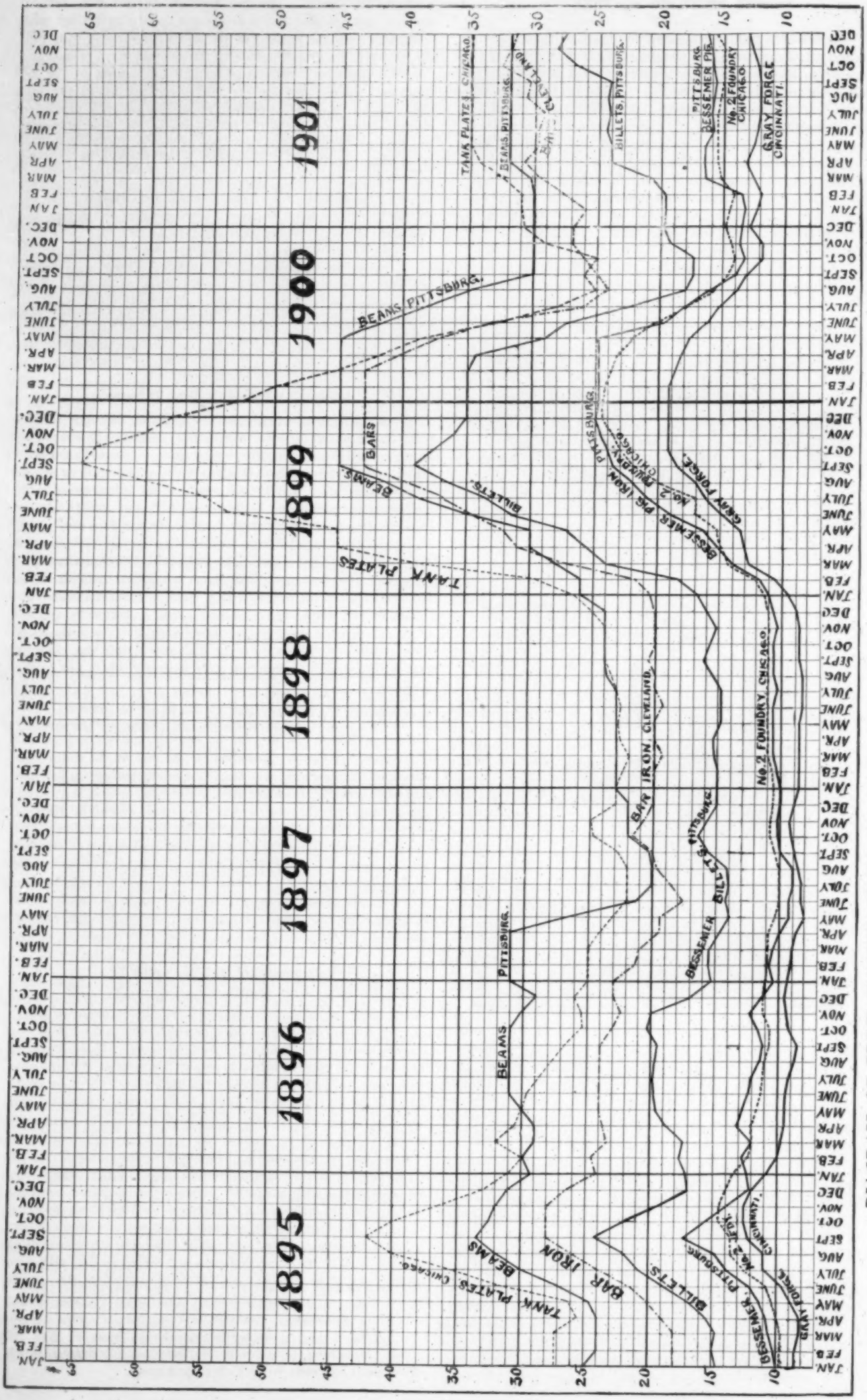


DIAGRAM OF PRICE FLUCTUATIONS IN IRON AND STEEL IN 1895, 1896, 1897, 1898, 1899, 1900 AND 1901.

(Prices in dollars per gross ton of Pig Iron and Billets; per net ton of Plates, Beams and Bar Iron.)

IROM MARKET FLUCTUATIONS IN 1901.

Price lines for seven years are represented in the diagram on the opposite page and they tell an interesting story of booming and collapsing markets and of intervals of comparative steadiness. The little boom of 1895 and the great boom of 1899 both appear among the years that have been plotted, and the downward plunging of the lines after the dizzy altitudes reached in the fall of the two years, confirms the maxim that what goes up must come down.

But the price lines for 1901 tell only part of the story of the wonderful year that is closing. It outtops all years in the history of the iron trade. Greater than any other in production, it will always be marked as the year when the consolidations in the American iron trade were rolled into the world's greatest consolidation, and when the power of giants to harm each other in the fiercest of competitive struggles was concentrated upon the problem of constructing and firmly establishing a colossus of industrial community. The year 1901 has seen also the springing up of a multitude of new plants for iron and steel production and the partial unfolding of plans for others—all giving promise of a day not far remote when the ability to produce will be beyond the country's power to absorb. Of the time of that consummation and of its workings out as they shall affect the profits of iron and steel manufacture and the status of the various factors in the trade, no man can now predict. That 1901, with its strong tone, its advancing prices and its splendid profits for furnaces, steel works and rolling mills will be equaled by any year in the near future seems scarcely probable. What really has occurred thus far in the restoration of a sound basis, after the startling lesson given by the year 1900 in the effect of high prices, is a magnificent expansion of iron consumption and its sudden compression in the straight jacket of outgrown railroad facilities. It is for the new year to show whether this unfortunate check upon all industry is to leave a numbing effect that will not pass away before some new complication has arisen to give the situation an unpromising turn. What has helped greatly is the conservative attitude of large interests in the matter of prices for iron ore and coke for 1902.

Apart from the formation of the United States Steel Corporation, the more important corporate changes of 1901 were the acquisition of the Cambria Steel Co. and the Pennsylvania Steel Co. with its dependent Maryland Steel Co. by Pennsylvania railroad interests, giving that great corporation its own supply of steel rails and other products besides making it an important selling factor in iron and steel. Of special interest also was the acquirement of control of the Bethlehem Steel Co. with its armor plate department and forging plant, by the president of the United States Steel Corporation.

Of the new plant, completed in the year, and the greater capacity that is building, particularly in the Pittsburg district, a summation is given in other columns. In the multitude of new projects that are the fruit of consolidations and prosperity, it should not be overlooked that all the important steel companies have made additions in the past year representing millions of dollars. The Sharon Steel Co., with a steel making capacity of fully 1,000 tons a day, is a new contribution of the year, but the Cambria and Pennsylvania companies have had improvements under way, Jones & Laughlins have been constantly building throughout the year; the Lackawanna Iron & Steel Co. has made good progress with its Buffalo works, ultimately good for 2,000 tons of steel a day; the Colorado Fuel & Iron Co. has under way work that will cost several millions; the Tennessee Coal, Iron & Railroad Co. has increased the efficiency of its furnaces and laid plans for greater steel finishing capacity; the Republic Iron & Steel Co. has blown in new furnaces, finished a Bessemer steel plant and nearly completed a billet mill; the steel companies of the United States Steel Corporation have made new records of production and have comprehensive plans on foot for material additions. At the Canadian Sault a steel plant is nearing completion which will be occupied with Canadian work for a time, but the finishing plants that are to follow will turn out material that may some day find its way to this side of the line. At Sydney, Cape Breton, three furnaces were put in blast in the year. Steel works will follow in 1902; but the export trade is the destination of the product, and whatever competition comes from this source to the steel works of the United States will be in foreign markets. The effect of much of this new capacity and of other plants referred to in the Pittsburg review elsewhere in this issue will be felt without doubt in 1902.

Record breaking production by the blast furnaces was a feature of 1901. But for the coke scarcity and the banking of furnaces it compelled, there would no doubt have been an output of 15,750,000 gross tons. For the first half of the year the official figures showed 7,674,613 gross tons. In the balance of the year the weekly furnace capacity was 310,950 tons on July 1, 303,847 tons on Aug. 1, 299,861 tons on Sept. 1, 307,982 cons on Oct. 1, 320,824 tons on Nov. 1 and 324,761 tons on Dec. 1.

The shipments of Lake Superior ores by water and all rail were about 20,700,000 tons, including Canadian ore shipped from Michipicoten bay. The ore production for the entire country will probably prove to have been close to 30,000,000 tons. The base price for old range Bessemer ores was $4.25, as against $5.50 in 1900 and $2.95 in 1899.

Prices of the Year.

On the opposite page we give a chart showing the fluctuations in the prices of leading products in 1901 and in the six years preceding. The vertical lines represent months and the horizontal lines prices per ton in dollars. The solid and broken lines traversing the diagram indicate the changes in monthly averages and do not show necessarily the lowest or highest price touched in a given week. For 1901 these are shown in the second table below. The chart for 1901 shows a marked approach to the horizontal lines, as compared with 1899 and 1900. The tables of monthly averages from which the lines for 1901 were plotted is as follows:

AVERAGE MONTHLY PRICES OF IRON AND STEEL PRODUCTS IN 1901.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No 2 Fdy Ch c·go ...	$14 60	14.12	15.19	15.50	15.50	15 50	15.50	15.20	5.00	15.00	15.00	15.50
Gray Forge Cincinnati ..	$12.25	11.87	12 56	13.12	12 60	12.25	12,00	12,00	12 00	12,25	12,69	13.00
Plates Chicago	$31 00	3 .00	32.40	34.40	35 00	35 00	35.00	35.00	35.00	35 00	35.00	35.00
Billets (Bess Pittsburg ..	$19.75	19.75	20 81	24.12	24 20	24.44	24.25	24.40	24.12	26.80	28.25	27.62
Bessem'r Pig Pitt burg	$13.25	13.60	16.56	16.69	16 65	15 94	16.00	15.90	15.71	15.9·	16.10	16.35
Beams Pittsburg	$30 00	30 00	30 40	32 co	32.00	32,00	32,00	32.00	32,00	32.00	33 oc	32 00
Bar Iron Cleveland ..	$25 80	27.80	29.30	30 80	29.80	29 8	29,40	30.80	30,60	32.8·	32.00	31.70

In the table below the prices of various products for furnace or mill shipments in round lots, are given for the beginning and end of the year, also for the lowest and highest weeks of the year. Sheets, which are not shown in the table, opened the year at 2.05c Pittsburg for No. 28 and in the height of the scarcity caused by the steel strike sold as high as 3.75c and 4c. Steel rails opened the year at $26 and advanced to $28, which is the price today. Tin plates have maintained an even price of $4 for 100-pound coke plates through the year.

	Jan. 1, 1901.	Lowest Week, 1901.	Highest Week, 1901.	Jan. 1, 1902.
Local No. 2 Fdy. Iron, Chicago...	$ 14.75	$14.25	$ 5.75	$ 5.75
Gray Forge, Cincinnati.....	12.75	11.75	13.45	13.25
Tank Plate, Chicago net ton.....	31.00	31.·0	35.00	35.00
Bessemer Billets, Pittsburg.....	19 75	19 75	28.50	28 00
Beams, Pittsburg, net ton.....	30.00	30.·0	3·.00	32.00
Bessemer Pig, Pittsburg.....	13.50	13.00	17.00	16.75
Bar Iron, Cleveland, net ton.....	27.00	26.00	33.00	31.70

The Cleveland Lake mine, Ishpeming, Mich., will ship ore to the docks this winter and store it there. About 200,000 tons will be accumulated. The mine is now employing 550 men and hoisting 2,000 tons a day.

Eugene F. Brandt, formerly of the Lake Angeline mine, Ishpeming, Mich., and in the past year superintendent of the Marquette and Menominee range explorations of the Clergue syndicate, has become general superintendent of all the syndicate's mines, including in addition to what he has had, the iron mines in the Michipicoten district and the nickel mines at Sudbury, Ont. The superintendency of the Helen iron mine will be in the hands of Capt. Arthur Buzzo, heretofore in charge of Crerar, Clinch & Co.'s interests in the Crystal Falls district.

The Chicago Iron Trade in 1901.

BY GEORGE H. GRIFFITHS.

No year has been of greater interest and significance to the iron and steel industry of the United States than the one just closed. Not only did it see the birth of the greatest industrial corporation in the world's history, but it saw this nation placed unequivocally in the foremost rank of the world's manufacturers of iron and steel products. The production and consumption of iron and steel in 1901 exceeded all previous records, and at prices the average of which on material delivered in the year was higher than any yet recorded for the delivered products of a twelve-month. These facts are the more noteworthy in that the year was fraught with greater labor upheavals and other domestic disturbances, all of which naturally militated against manufacture and trade. In response to the great demand new mills and furnaces were built in many parts of the country, old plants remodeled and equipped with improved machinery, very greatly increasing the output of the previous year. Notwithstanding this greatly reinforced productive capacity, the new year finds many manufacturers with their output taken for months ahead, and on some finished products for the entire year.

Much of this growth and stability was due to the re-election of President McKinley in 1900 and the assurance given to investors and manufacturers at that time of a continuance of the policy that in 1897 lifted the iron trade and all kindred industry from the lethargy that had afflicted it in prior years. Certainly it is true that never before to the same extent have manufacturers of pig iron and finished product, found themselves in the condition existing at the present time—practically unable to handle more business within six months, and issuing instructions to salesmen to take no more orders without first learning from the home office if the material can be delivered within the required time.

How Production Was Hampered.

That a still better showing in productive and consumptive capacity was not made was due to the strikes among the men engaged in the metal trades, and to the other harrassing factors which manufacturers had to contend with during the year. Commencing with the machinists' strike in May, which threw out of employment many thousands of men in all parts of the country, for a period varying from a few weeks to three months, there followed the abortive attempt of the Amalgamated Association of Iron, Steel and Tin Workers to tie up the plants of the United States Steel Corporation. The utter collapse of this strike is well remembered by all who keep in touch with iron and steel interests. The local effect of the steel strike was to tie up for a brief time some of the mills at Joliet and Milwaukee, and to show how weak was the hold of the association on its members, particularly those in the West, when it advocated a policy detrimental to the best interests of the men, as illustrated by the refusal of the employes at South Chicago to obey the strike order. The Chicago molders' strike in July and August, was more local in its effect, very greatly reducing the consumption of pig iron in this city in its acute stage. Following close upon the heels of labor troubles, came the drought in some of the Western states, which resulted in the cancellation of a large tonnage of farming material. This was recovered, later, however, when the returns showed that the blight on the crops was not so extensive as first reports indicated. Next in order was the car famine which seriously curtailed shipments of coke and finished product from Eastern districts to this territory. Three furnaces located near Chicago had to go out of blast from lack of coke, and four new furnaces had to remain idle several weeks for the same reason, depriving the market of many thousand tons of pig iron per week which was badly needed. A number of foundries and manufacturing establishments, whose operation depended on their supply of iron and steel, had also to shut down in part. The effect of all these demoralizing conditions was to glut the market with spot delivery orders, and high premiums were asked and cheerfully paid to secure the desired shipment.

A Year of Steady Prices.

One of the most remarkable features of the market throughout the entire year was the uniformity of prices on nearly all products in the face of a constantly increasing demand. There was a forced increase in values during the strike period, caused by the scarcity of material, but this was only temporary; and while local independent bar mills booked a large tonnage of bar iron at the advanced rates during the labor disturbances, and jobbers with stocks of sheets, tubes and plates on hand, secured high premiums for the same, prices fell to their former level immediately after the strike was ended Steadiness in prices was probably the most pronounced feature of the year. Rarely has there been so little fluctuation as in 1901. With consumers anxious for deliveries all the time, and mills constantly sold months ahead, there has been no inflation of prices, and when the demand fell off, there was no sudden and violent fall in prices. In May, after the price of standard rails had been advanced from $26 to $28 a ton, in accordance with the agreement of rail manufacturers, this price was maintained in the face of a demand that far exceeded the capacity of all the mills in the country. The price of tin plate was maintained at $4 per 100-pound box of coke plates, notwithstanding that the trade expected an advance in view of the heavy demand and the elimination of all foreign competition, and offered premiums to secure prompt shipment. The National Tube Co. held prices unchanged, and in the first week in July the American Sheet Steel Co. announced a reduction in the price of black and galvanized sheets, varying from $1 to $5 a ton, which was maintained despite the greatly increased demand that followed in the months of the strike. There were several advances and declines in pig iron during the year, but the market was devoid of any erratic changes. The increases and decreases were legitimate.

Another feature of the market, worthy of special mention, was the unprecedented buying of standard rails. There was under construction or under contract at the commencement of the year, according to a reliable railroad authority, nearly 6,000 miles of new track, in various parts of the United States, and extensions contemplated that would increase the mileage of the country by another 3,000 miles. The opening months of the year found the local mill filled with orders for the first six months, and buying was sporadic until the advance in May to $28 a ton. The Chicago interest early felt the impetus that was given to the market by this advance, and before the month was out, it had contracted for its entire capacity for the year, and mills in other parts of the country soon reported a similar condition. Buying for delivery in the present year, commenced in September, and within a month it was estimated that contracts for 1902 delivery, amounting to about 1,000,000 tons had been placed, of which, 500,000 tons were taken by the local mill. Including the large tonnage that could not be rolled last year, it is estimated that mills have on their books close to 2,000,000 tons for this year's delivery.

The year was marked also by very heavy buying of iron and steel bars, structural steel and merchant pipe. Railroad interests and implement manufacturers were the greatest factors in the consumption of the former material, the great demand for cars compelling all Western roads to increase largely their rolling stock. The building trades strike in Chicago in 1900, which delayed the construction of many buildings until the following year, and the stupendous improvements inaugurated by railroads for maintenance of way, flooded mills with orders for steel shapes, while the discovery of oil in Texas and Southwestern California, created a demand for merchant pipe which taxed the capacity of the mills of the country.

Pig Iron.

Uniformity of prices and phenomenal consumption, were the two most pronounced features of the year's trading in pig

iron Probably in no other section of the country has there been so great an increase as in the West, and not in recent years have there been so few changes in quotations in a year. Southern irons responded to the laws of supply and demand more quickly than did Northern grades, all through the year, but the rises and falls never exceeded 75 cents at one time, and the difference between the highest price paid for No. 2 foundry, and the lowest price during the year was not greater than $1.50, the lowest figure for Northern No. 2 foundry being $14 in February, as against $15.50 in December; and for Southern No. 2 foundry, $13 in February as against $15.15 in December. Almost without exception the foundries exceeded previous requirements, and were compelled to enter the market earlier than usual. This condition naturally created a demand for iron for prompt shipment, which furnaces at no time were fully able to meet. Had the year been free from strikes and other trade disturbances, the consumption of iron would have been materially greater.

The year opened with Northern iron selling on the basis of $14.75 to $15 for No. 2 foundry. January and February were quiet months, notwithstanding the fact that other branches of the iron and steel market were strong, and Eastern furnaces particularly active. Many consumers contracted for their needs in 1900 for the first three months of the year, and in some cases six months, and seemed content to wait until furnaces reduced prices before buying for future needs. The market was weak, and for the only time in the year concessions were made to get business. The anticipated reduction came in January, and was followed by another in February, the first for 25 cents and the second for 50 cents a ton. Buying immediately assumed a more lively tone, on the basis of $14 a ton for Northern No. 2 foundry, and consumers, realizing that the bottom of the market had been reached, placed large contracts for deliveries running through the year, and as far as May into 1902. The sales during March aggregated many thousand tons, and before the month closed, there was a total advance of $1.50 on both Northern and Southern No. 2 foundry, the former selling at $15.50 and the latter at $15.40. There was a slight falling off in tonnage placed during April, foundrymen expecting a reduction and buying only for pressing needs.

During May, and until the latter part of June, buying consisted almost entirely of carload lots. This was caused by the outbreak of the machinists' strike, which had the effect of reducing Southern irons 50 cents a ton. In the latter half of June many buyers came into the market, the heavy melt of iron in the months preceding having depleted stocks, and these purchasers were increased by a large number of consumers whose contracts expired that month. Many of these inquiries were withdrawn the following month, however, as a result of the strike of Chicago molders and the shutting down of Eastern sheet mills, and there came another reduction of 25 cents in Southern irons. Local consumption was reduced to a minimum in July and August, by the molders' strike, and new business was limited entirely to carload orders, for which prompt shipment was demanded. Prices remained firm, however, and a large order that was offered at slightly below quotations at this time was refused. With the settlement of labor troubles in September, there was a noticeable increase in the volume and size of inquiries, and Southern furnaces took advantage of the improvement to make an advance of 50 cents, bringing the price of No. 2 foundry to a minimum of $14.65. Though carload orders still predominated, 1,000 ton contracts at this time became more numerous. The last week in the month saw heavy buying, 5,000 and 10,000-ton contracts being common. Most of the buying came from the implement and malleable interests, and covered wants to the end of the year and into 1902. October, November and December were also heavy months, contracts for many thousand tons being closed. Railroads and affiliated interests were large buyers at this time, a local car-wheel concern placing orders for about 40,000 tons of pig iron. During the latter part of November, Southern furnaces again advanced prices 50 cents to 75 cents a ton, and gray forge $1 a ton, making the selling price of No. 2 foundry, $15.15 to $15.40. The minimum price of Northern iron was withdrawn in December, and the year closed with No. 2 foundry selling firm at $15.50. In nine months, commencing with March, there was only one change in the price of Northern irons, and that occurred in August at the time of the molders' strike.

The delivery of iron was seriously interfered with during the last quarter of the year by the scarcity of cars, and premiums were willingly paid by those who had been caught short of iron. This scarcity of rolling stock also resulted in greatly reduced shipments of coke to local blast furnaces, and the Mayville furnace at Mayville, Wis., was compelled to go out of blast for four weeks, and two furnaces of the Illinois Steel Co., one at Milwaukee, on foundry iron, and another at Bridgeport, Ill., on malleable iron, were also compelled to cease operations early in November.

The productive capacity of this territory was increased during the year by the completion of stack No. 2 of the Iroquois Iron Co., at South Chicago, which has a daily capacity of 300 tons, and stacks Nos. 9 and 10 of the Illinois Steel Co., also at South Chicago, each with a capacity of 15,000 tons a month. The Illinois Steel Co. also completed stack No. 4, which had been overhauled and enlarged, its capacity being increased from 9,000 to 12,500 tons a month by the improvements. The Minerva furnace at Milwaukee changed ownership during the year, and is now being rebuilt and enlarged. It is expected it will be completed about next June. None of the new furnaces were put in blast last year, owing to the insufficient supply of coke caused by the scarcity of cars.

Iron and Steel Bars.

The consumption of iron and steel bars has been exceedingly heavy during the year. This was due in a great measure to the strike in Central Western mills, which deflected considerable tonnage to the local concerns, though the increased activity of implement manufacturers and car builders had much to do with the large tonnage that has been turned out during the year. Not for many years have kindred manufacturing trades been so active as in 1901, as with scarce an exception consumers of merchant iron purchased far beyond previous requirements. Iron and steel was selling firm at 1.45c to 1.50c in January, with consumers specifying heavily on contracts all through the month. The steel mills opened the year with their capacity taken for several months ahead, many of the contracts having been taken in July, 1900, at very low prices, and were turning away business that called for delivery within the first four months. Prices were advanced in February to 1.55c for steel, and 1.50c for iron, and with the close of March, there was a further advance, steel selling at 1.60c to 1.65c, and iron at 1.55c to 1.60c. During the latter month and in April, agricultural implement manufacturers and car and wagon builders came into the market two months earlier than their usual custom, and placed large contracts for deliveries extending to July of 1902. May and June were quiet months, buyers apparently waiting for the disquieting labor situation to define itself, and purchasing only for pressing needs. With the outbreak of the Amalgamated Association strike in July, an immense tonnage came to local mills, and manufacturers that could furnish material promptly got from $2 to $3 premium for it. This heavy buying continued through August and September, steel bars advancing in the former month to 1.70c, and iron to 1.65c. On long time contracts, the price was 1.55c for steel, and 1.60c for iron. So great became the demand for material that prices were again advanced in September, and at the close of the month, steel for prompt shipment was selling at 1.75c to 1.80c, and iron, 1.70c; on extended deliveries, steel, 1.65c, and iron, 1.60c. October was marked by another advance in bar iron, of $1 a ton for long time delivery, making the price 1.70c. In November the bar iron manufacturers west of Pittsburg, with the exception of the National Rolling Mill Co., of Hartford City, Ind., and the Hirsch Rolling Mill Co., St. Louis, organized a pool to maintain prices, and announced a reduction of $1 in the price of iron, making the price of both iron and steel bars, 1.65c. The quotations for prompt shipment were also withdrawn, the mills having contracted for all the material they could roll during the remainder of the year. Buying during the last quarter of the year, was of excellent proportions, and all the mills closed the year with their capacity taken for a considerable period of 1902.

The output of this territory has been increased by the completion during the year of the plants of the National Rolling Mill Co., Hartford City, Ind., with a capacity of 40,000 tons a year; the Highland Iron & Steel Co., Terre Haute, Ind., with a capacity of 50,000 tons a year, and the Hirsch Rolling Mill Co., St. Louis, with a capacity of 45,000 tons a year. All the new mills will manufacture bar iron.

Plates.

In the last four months of the year, the plate market was the only weak feature of Western trading. This may be attributed to the fact that just preceding the strike many consumers bought heavily, and consequently buying suffered a relapse in the last half of the year. Transactions in February and March were heavy, about 20,000 tons being booked in the former month by the local mill. Prices were advanced $1 to $2 a ton in March, and again $2 a ton in April. Up to this time prompt delivery of material had been almost impossible to get, mills having sold their capacity for several months ahead early in the year, but the market weakened some in May and June. In July an advance of $1 a ton was announced on ⅛-inch plates and Nos. 10 to 12. The outbreak of the strike anticipated much business, considerable tonnage in light plates being turned from Eastern points. Buying was heavy in August, but fell off again in September and continued weak throughout the remainder of the year. In December the local mill, not being very busy, shut down two weeks for repairs.

Rails.

At the opening of the year the local interest had sufficient tonnage on its books to keep its mill in operation the first six months, if another order was not taken, and it was very sanguine of the prospects for future business. Owing to inability to get early delivery railroads were slow in coming into the market for future needs, and buying was only of normal proportions until the advance of $2 a ton was announced in May. Immediately there was a rush to cover and before the month closed the local mill had contracted for its entire capacity for the remainder of the year. No orders for delivery in 1902 were taken, notwithstanding many thousand tons were offered nearly every week for such deliveries as mills could give. Not until September did the local producer commence taking contracts for shipment in the following year, and within a short time, its books were full and it was compelled to refuse further business. Never had there been such heavy advance buying of standard rails in 1901. The price of $28 a ton was maintained in the face of this urgent demand, though it was possible at all times of the year to secure higher prices for guaranteed deliveries.

Billets.

Owing to the heavy demand for finished products and the consumption by mills of all the billets they could make, there has been comparatively little steel for sale in this market. Orders for 10,000 tons going begging were common during the year. Prices rose steadily from $20.75, for Bessemer billets, and $21.75 for open-hearth in January to $31 for the former and $33 for the latter, at which they closed in December.

Structural Steel.

In this material the past year has been an excellent one from every standpoint. Many large building enterprises which were delayed in 1900 were started and completed in 1901, and the year was marked also by a pronounced activity in building operations on smaller lines. Railroads and car builders were heavy buyers of material all through the year, the increases in the size of rolling stock demanding large outlays for maintenance of way, and the unprecedented demand for cars compelled all railroads to add largely to their number. The last half of the year was marked by the inability of mills to catch up on delayed deliveries and considerable business for shipment in the last half had to be refused.

Sheets.

Jobbers reaped a harvest in the sale of this product during the year. From January to December the demand far exceeded the capacity of the mills, and sales were governed at all times by the supply. Early in the year mills got far behind in deliveries, and were compelled to divide their stock pro rata among customers. The strike threw them still further behind, and the car famine following close upon the heels of labor disturbances only added to the difficulties of the situation. As a result of all these disturbing elements, the demand from jobbers' stocks was phenomenal, and fancy prices were commanded for prompt shipment. In March, mills advanced prices on sheets of gauge No. 18 and heavier $3 a ton; on No. 19 and lighter, $4 a ton, and on galvanized sheets $6 a ton. Later in the month black sheets were advanced $3 a ton. For reasons of policy and to be closer in line with plate prices, but not because there was not a plentiful supply of business, the American Sheet Steel Co. announced in July a reduction of $5 a ton on light gauges, $2 a ton on heavy gauges, and $1 a ton on blue annealed sheets, with the accompanying statement that henceforth mills would not handle orders for less than 500 bundles from jobbers. These quotations remained intact the balance of the year, though the prices of jobbers was governed at all times by the size of the order and delivery required. The plant of the Waukesha Sheet Steel Co., Waukesha, Wis., was completed and put in operation in the last month of the year. It has a capacity of 75 to 100 tons of sheet steel daily.

Wire and Wire Nails.

Manufacturers of wire products have been extremely busy in all departments all through the year. The demand for nails was particularly active, the consumption exceeding all previous figures, and not until the closing weeks of the year was any weakness felt or shading of prices in this product. These concessions were brought about by the entrance into the field of several independent manufacturers late in the fall, and wire nails in carload lots to jobbers, which had been selling all through the year at $2.40, were reduced in December to $2.30. There was a corresponding decrease in the price of other wire products. The reports in July and August that the crops in certain Southwestern States had been ruined by drought resulted in the cancellation of a large tonnage, but this was recovered later when closer investigation proved the condition was not so alarming as first reports indicated. The local manufacturer operated its Western mills during the summer months, the volume of business preventing them shutting down for the usual repairs. Heretofore it has made a practice of accumulating large stocks of nails and farming material for the spring influx of business, but so great was the demand last year that the entire output of its mills was consumed in filling orders. The only change of importance in the year was the acquisition in May by the American Steel & Wire Co., of the plant of the Continental Wire Co., Granite City, Ill., which has a capacity of 100 tons daily.

Old Material.

The fluctuations of old metal during the year have been out of all proportion to the steadiness which has prevailed in other lines. This is all the more surprising when the enormous volume of business that has been transacted is taken into consideration. On only one item was there an advance which was maintained for any length of time, and that was relaying rails. Owing to the inability of railroads to get new rails from the mills in sufficient quantities for their needs, many were compelled to use relayers, and high prices were obtained by such dealers as had them. There have been periods of heavy buying during the year, but owing to the limited number of heavy consumers, all efforts to bull the market on the part of dealers have failed. In November, a meeting of scrap dealers was held in Cincinnati for the purpose of arranging a scale of selling prices, and a committee was appointed to confer with mills. Nothing definite had been accomplished at the close of the year, and it is not thought likely that anything will come of the movement.

New Plants Completed in the Year.

The principal additions to the productive capacity of this section that have been completed during the year are stack No. 2 of the Iroquois Iron Co., at South Chicago, and stacks Nos. 4 and 9, of the Illinois Steel Co., at South Chicago. The latter company also completed during the year, the re-equipment and enlargement of stack No. 10, increasing its capacity about 4,000 tons a month. The Minerva furnace at Milwaukee went out of blast in the spring, and is now being rebuilt. The Hirsch Rolling Mill Co., of St. Louis, Mo., whose plant has

a capacity of 38,000 tons of merchant and refined bar iron, and consists of a Belgian train, 10-inch roughing, 8-inch finishing, a 16-inch bar mill and an 18-inch muck mill, commenced making iron Aug. 1; the Highland Iron & Steel Co., Terre Haute, Ind., which has a 20-inch puddle mill, and one 10-inch guide mill, with 12-inch Belgian roughing train, started operations in November. This mill has a capacity

AVERAGE MONTHLY PRICES OF IRON AND STEEL AT CHICAGO IN 1901.

[Pig iron and billets, gross tons; finished material, net tons.]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
L. S. Char. Ir'n	18.50	18.50	17.62	18.00	17.80	17.50	17.50	17.50	17 50	17.50	17.50	18.25
Nor. No. 2 Fdy	14.60	14.15	15.19	15 50	15.50	15.50	15.50	15.20	15.00	15.00	15.00	15.50
Sou. No. 2 Fdy	14.55	14.20	15.02	15.40	15.25	14.72	14.77	14 15	14.21	14.65	14.90	15.15
Bar Iron	29.00	29.00	30.70	31.70	31.00	31.00	31.00	33.00	33.20	33.20	33.20	33.00
Rails	26.00	26 00	26.00	26.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Tank Plates	31 00	31.00	32.40	34.40	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Billets	20.75	20.75	24.37	26.00	28.00	30.00	31.00	31.00	31.00	31.00	31.00	31.00
Sheets No. 27	63 60	63.00	65.50	68.00	68.00	68.00	68.00	*76.80	82.00	81.00	75 70	69.50
Old Rails	18.50	18.50	18.50	19.87	19.80	19.00	19.00	19.80	20.00	21.00	21.00	21.00
Old Wheels	15.60	16.00	16.25	16.75	16.50	16.00	16.00	16.00	16.00	15.60	15.50	15.00

* From August, prices are for sheets out of store. Mills not a factor in this market since the end of the strike.

of about 50,000 tons per year; the National Rolling Mill Co., Hartford City, Ind., also manufacturers of bar iron, commenced operations in October. The Waukesha Sheet Steel Co., Waukesha, Wis., started in November. The latter plant has a capacity of 75 to 100 tons of sheets daily. The Inland Steel Co. is erecting an open-hearth steel works at Indiana Harbor, Ind., which it is expected, will be completed in February, 1902. This plant consists of four 50-ton basic open-hearth furnaces, with a capacity of 400 to 500 tons daily, a 32-inch blooming mill, and 24-inch and smaller bar mills. The company will manufacture blooms, billets and bars. Other minor additions have been made to the mills in this section, and still further improvements contemplated during the year.

THE NEW YORK MACHINERY MARKET.

NEW YORK, Dec. 30.—The holiday season has not seriously interfered with the trade and the general situation of the machine business continues to hold a healthy tone. The market is sufficiently strong to warrant the anticipation that the opening months of the coming year will see a phenomenal extension of business with correspondingly heavy purchases of new machinery. The exportation of machinery has continued quiet throughout the year, and there are few positive signs of any change in this condition. The closing of hostilities in South Africa has been frequently predicted, and a date assigned, but the clearing of the financial atmosphere in Great Britain still awaits the materialization of these hopes. Other European nations have met with industrial trouble and there has been a reduction in the foreign demand for American machinery, prices in the foreign markets having fallen and those at home having risen to an extent that remunerative competition was out of the question. Some few firms have maintained a good export trade to Europe in spite of these restrictions through the specialization of their product. The Potter & Johnston Co. of Pawtucket, R. I., is in this class, and on a recent visit the writer was shown the order book and a goodly list of names read to prove the claim made for the sales in the majority of the leading European nations. The falling off in the foreign trade in standard machines is nevertheless a feature of the situation and there is at present no inducement to struggle for a business at ruinous figures, whilst the domestic demand is so difficult to satisfy. The immense sums to be spent in improved railroad facilities in and around the city, the expenditures upon new manufacturing enterprises and the building activity, all point to the advent of an exceedingly prosperous year.

The wire and wire nail situation is improving and the market exhibits renewed strength, the lowest point having been reached to all appearance. A number of producers, rather than sell their output at the standard rate, have withdrawn from the market with the effect of curtailing the supply, resulting in a better tendency in current quotations. There is again a report of progress in the formation of a pool to regulate the output and prices of wire products but nothing real as yet.

There will probably be some decline in the price of brass to conform to the drop in copper, and it is expected that a meeting of the larger brass manufactures will be held in the present week. The meeting of some two weeks ago considered the situation, but deprecated any definite action prior to the new year as likely to be of greater harm than benefit to the industry. It is probable that the cut in prices will amount to a reduction of 10 per cent in sheet brass and copper.

A contract for the thirty electric cars for a Welsh municipal line cars has been placed through the British Westinghouse Electric & Mfg. Co. The contract amounts to $72,500, and the equipment will be manufactured in this country.

Browne & Frothingham of 32 Broadway, acting as export sales agents for a number of American manufacturing concerns, have opened a department for the purpose of handling machine tools for the foreign trade. This branch will be under the supervision of A. M. Fisher, formerly of Stone, Fisher & Co., of Yokohama, who has just returned from the Far East after three years spent there in devoting his time exclusively to that branch of engineering. Catalogues and prices are solicited from the manufacturers of machine tools in the United States.

The decision to move the Riker Motor Vehicle Co. from Elizabeth, N. J., to Hartford, next summer, has met with considerable opposition, and the announcement of the resignation of A. L. Riker of this city, First Vice-President Byllesby, Chief Engineer Whiting and Chief Constructor Sammis, was not therefore so much of a surprise. It is said that the resignations are the preliminary step in the organization of a new company to be located in Elizabeth.

The New Haven Mfg. Co., manufacturers of iron working machine tools, is running over time in an attempt to get level with rush orders. The firm makes a standard line of engine lathes, planes, slotting and drilling machines, etc., at the stand where it has been located for the past 50 years.

The new electric power plant at the Brooklyn navy yard has been completed and will be turned over to the government for the thirty days' trial before the work can be accepted. The structure is 100x80 feet, and the total cost $200,000.

The Crocker-Wheeler Co. of Ampere, N. J., has recently shipped electrical equipment to the following: Two 400-k. w. generators to the Vandergrift Construction Co.; 300-k. w. generator to Stetson & Co. of Philadelphia; 150-k. w. generator to the D'Olier Engineering Co. of West Camp, N. Y.; 40-k. w. generator and 28 motors to the Smith-Brooks Publishing Co., Denver, Col., and motor equipment to the U. S. Tube Co., Buffalo., and the C. P. Curran printing office at St. Louis, Armour & Co., the American Bridge Co. and the Marion Steam Shovel Co. The company finds business unusually brisk for this season of the year and has some difficulty in meeting the demand.

The De Beers Consolidated Mining Co. has placed additional orders to these recently tabulated for the new power at the South African mines. It is said that the Burt Mfg. Co. of Akron, O., has received a contract for a large oil-filtering equipment, and that Milliken Bros. of the Bowling Green Building has secured the order for the necessary structural material.

South Africa is likely to give an important outlet for machinery when conditions there get down to a normal business state. At present the Johannesburg Town Council is inviting tenders for the supply and delivery of a complete carburetted water-gas plant of about 200,000 feet capacity daily. The total cost, including erection, is anticipated to be about $75,000.

J. F. Villalta of Barcelona, Spain, is on a short visit to this country for the purpose of placing contracts for agricultural machinery, a beet sugar plant of 600 tons capacity, cable ways for mining purposes, mining and machine tools, etc. He will have temporary headquarters at the offices of Alfred H. Post & Co., in the Produce Exchange.

M. A. Hudson and H. S. Whitney, formerly connected with one of the large machinery supply houses in New York, are representing in New York and vicinity the Standard Gauge Mfg. Co., Syracuse, N. Y.; J. E. Lonergan & Co., Philadelphia, Pa., and the Penberthy Injector Co., Detroit, Mich. They have offices at 141 Broadway.

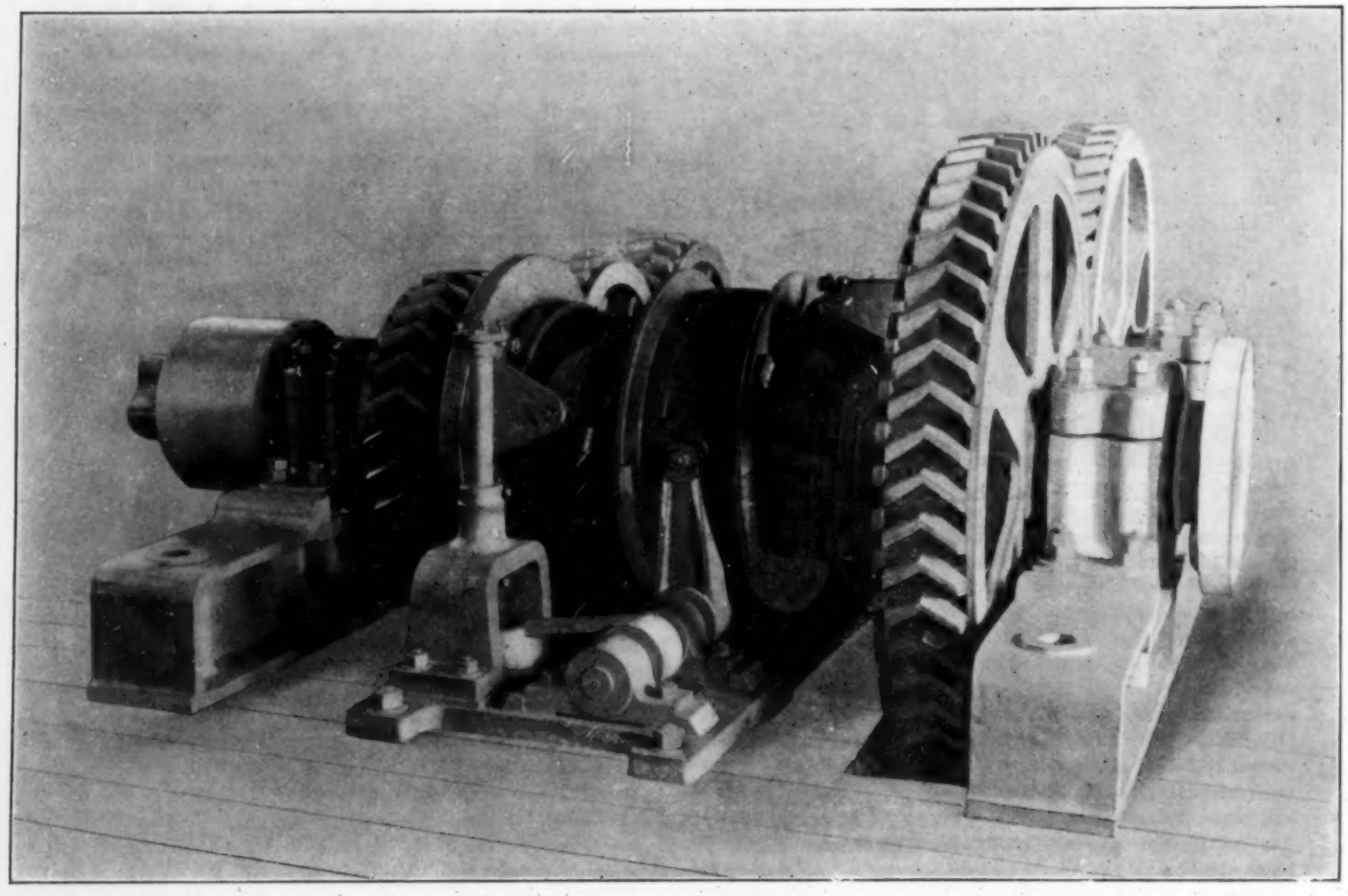
A ROLLING MILL REVERSING GEAR.

The technical details of the clutch manufactured by the Coil Clutch Mfg. Co., of New York, were illustrated in the article recently published in *The Iron Trade Review*. The accompanying half tone shows a reversing gear of this type applied to a rolling mill at the plant of the Volga-Vischera Iron Works at Moscow, Russia. It is of remarkably rugged construction and weighs 128 tons. The rolling mill is employed in the production of 12-inch armor plate and is driven by means of two shafts placed with their axes in line. One is driven directly by the engine and the two parts of the shafting are coupled, disconnected and reversed by means of two coil clutches, five gears and a counter shaft. When the mill is driven in the one direction the power is transmitted through these five gears and when it is driven in the other direction the two parts of the shaft are rigidly connected and the gears run idly. The whole combination is an unusually massive arrangement of gearing. The remaining details of the illustration were clearly outlined in the description published heretofore.

IRON TRADE SITUATION IN GERMANY.

British iron and steel manufacturers have not recently heard so much of German competition as they were accustomed to do a few years ago. This is not so much because the competition has ceased, or even materially slackened, as because of the more engrossing and much more portentous appearance of American competition. The fact is that the cost of pig iron in Germany places a serious obstacle in the way of that country being a severe competitor, except under conditions that are not in any material degree difficult to meet. The average price of pig iron in Germany is rarely under 50s. per ton. Taking the last three years, the average official price—returned in the Government reports for the whole Empire—was 52s. in 1898, 56s. in 1899, and 64s. 6d. in 1000. British pig iron should have no difficulty in meeting the competition of steel founded on such prices as these, and presumably incapable of being produced on a cheaper basis. Nevertheless, the German exports of iron and steel have be n making wonderful progress, and never more so than during the present year, despite the loud and general complaints of depression throughout the German ironmaking centres. For the first eight months of 1901, the excess of the exports of German iron and steel over the imports has been 1,096,924 tons, against 324,010 tons in the first eight months of 1900, and 500,110 tons for the first eight months of 1899.

These figures appear on the face of them to be almost incredible. They are explained by two main facts—the fact that the German imports for the period in question have fallen from 682,179 tons, in 1900, to 303,160 tons, in 1901, and the second that the exports have increased from 1,006,189 tons to 1,400,084 tons. Hence it appears that a decrease of about 56 per cent in imports has coincided with an increase of about 40 per cent in exports, which, for the year 1901, have reached a record figure, as did the imports in the year 1900. It behooves British manufacturers to inquire into the causes of this rapid and remarkable increase of German exports. One explanation is obvious, and probably sufficient. It is well known that there has been a great slump in home demands in 1901, and that prices have suffered a great fall. On the other hand it has been necessary for the majority of the iron and steel works to remain in operation, in order to avoid the difficulties and dangers of a more serious crisis than that which has actually taken place. As it is a number of blast furnaces have been blown out, and the output of pig iron has been materially reduced. The majority of these are not likely to be re-lit until trade has taken a more favorable turn. This event may coincide with the Greek Kalends. No one appears to anticipate that there will be a rapid revival of German industry. When that revival does happen, the immense increase of productive resources provided during the last two or three years will be likely to limit its operations in the way of raising prices or allowing exceptional profits, so that German iron trade finds itself "between the devil and the deep sea," and its position is made still more unsatisfactory by the threatened encroachments of the United States, which have caused in Germany quite as general a feeling of insecurity as in our own country. —[London Iron and Coal Trades Review.



A ROLLING MILL REVERSING GEAR.

RAILROAD AND CAR BUILDING RECORDS IN 1901.

The *Railroad Gazette* publishes its annual estimate of the amount of new railroad mileage built during the year ending December 31. The figures have been obtained with great care from the best sources possible, but are necessarily smaller than the actual amount built, since a number of reports are not complete at this time. The amount of mileage built is estimated at 4,518, by 342 companies, as against 4,804 estimated last year, built by 285 companies. As in 1900, Texas leads in the amount of new track laid, with 537 miles; Oklahoma is second, with 398, and West Virginia third, with 266.

In Canada 163 companies built 658 miles of new road during the same period.

No completed railroad building at all was reported in Connecticut, Utah, New Hampshire and Nebraska, although there is work in progress in the last named State. As in 1900, the State which has increased its mileage the most during the year is Texas, with its 537 miles of track laid, by 16 different companies. Oklahoma Territory comes next in the list with 398 miles reported built during the year, and West Virginia is third, with 266 miles. Iowa, Michigan, and Missouri also have built more than 200 miles apiece, and there are nine States that have built more than 100 miles, in addition to those named above, as follows: Minnesota, 175; Indiana, 164; Wisconsin, 133; Ohio, 118; Mississippi, 109; New Mexico, 106; South Carolina, 105; Louisiana, 104, and Pennsylvania, 101.

The following list shows the progress in each State, compared with similar figures in 1900. The starred returns were obtained direct from the Railroad Commissioners:

	1900.		1901.	
	Companies.	Mileage.	Companies.	Mileage.
Alabama	13	187	7	71½
Alaska	1	4.5	1	3
Arizona	4	48	2	70
Arkansas	9	135	4	65
California	11	170.15	10	79.5
Colorado	7	139.6	2	61.37
Connecticut*	–	...	...	None
Florida*	10	157.5	29	76
Georgia	10	169.04	5	93
Idaho*	3	50.41	9	79
Illinois	7	95.8	8	81.17
Indiana*	4	66.7	2	164
Indian Territory	3	138.16	3	93
Iowa*	5	279.26	5	236
Kansas	–	.....	3	57
Kentucky	4	29.9	6	78
Louisiana	13	202.93	8	104
Maine	..	.....	1	12
Maryland	2	7	3	42
Massachus tts	..	.....	1	7
Michigan*	9	126.35	18	205.56
Minnesota	8	254.79	10	175
Mississippi	6	174.92	5	109.85
Missouri*	7	67.5	8	201.35
Montana	3	31.12	3	83
Nebraska	2	100.33	...	...
New Hampshire	1	18.54	...	...
New Jersey	2	4 44	1	5
New Mexico	–	.....	2	106
New York*	4	10.48	70	30.94
North Carolina	10	114.76	7	95.4
North Dakota	2	118 93	3	55
Ohio*	6	27.1	...	118.35
Oklahoma Territory	5	169.4	3	398
Oregon	4	67	2	32
Pennsylvania*	31	234.86	31	101.67
South Carolina	6	145.76	7	105
South Dakota	3	101 6	2	35
Tennessee	11	145.59	6	79.5
Texas*	18	313.43	16	537
Utah	2	8.95	...	...
Vermont	1	25.2	1	18
Virginia	6	70	14	34.5
Washington	9	88.8	7	83
West Virginia	11	215.7	10	266.5
Wisconsin	8	110.3	7	133
Wyoming	4	152.81	1	32
Canada*	–	.....	163	658
	286	4.804	342	4.513

Increase in Car Building.

The *Railroad Gazette* also reports that during the year 1901 the various car building works in the United States will have built, altogether, 142,514 cars of all kinds, the largest output for any one year, and 18,308 more than in 1900. These figures, of course, do not include cars built by railroads at their own shops. Of the 142,514 cars, 130,389 are freight, 2,089 passenger and 508 street cars for use in this country; and 4,359 freight, 85 passenger and 507 street cars for export. The figures for passenger cars include 202, and for street cars a few, for elevated service. Last year the total output of these works was 124,106 cars, as follows: 113,070 freight, 1,515 passenger and 6,091 street cars for use here; and 2,561 freight, 121 passenger and 784 street cars for export.

In analyzing the returns it will be seen that a large proportion of the increase over last year is in freight cars, while the output of street cars is less. The primary reason for the latter is, naturally, the lack of demand by the street railroads; but some of the builders of street cars have been kept busy on heavy equipment for suburban electric and elevated service, offsetting the decrease in orders for smaller cars. Of the 134,748 cars built for freight service, 27,843 were either all steel or had steel underframes. We do not know the exact proportion of each, but it is safe to say that nearly four-fifths are of steel throughout. Last year the totals were 14,464 all steel and 4,140 with steel underframes only. About 1,000 of the steel cars built in 1901 were sent abroad.

PERSONAL.

C. H. Foote, first vice-president of the Illinois Steel Co., Chicago, has resigned and will retire from business. T. W. Robinson, formerly general manager, has been elected first vice-president to succeed him. F. H. Foote, formerly superintendent of blast furnaces, has been elected second vice-president.

President Charles M. Schwab, of the United States Steel Corporation, accompanied by Mrs. Schwab, Dr. and Mrs. C. O. Goulding, Camille Mercarder and Mrs. Nash sailed last week on the French liner LaSavoie for a two months' tour of Europe. C. T. Schoen, inventor of the pressed steel car, took passage on the same steamer.

John Lawler, assistant superintendent of transportation at the Homestead mills of the Carnegie Steel Co., was appointed last week to the superintendency of the department to succeed John Molamphy, who retires after 35 years of continuous employment at this plant.

Charles H. Davis, vice-president for the third district, of the Amalgamated Association of Iron, Steel and Tin Workers, has resigned to accept an appointment as deputy sheriff at Newport, Ky.

John F. O'Deay, assistant general manager of the plant of the Youngstown Iron & Steel Roofing Co., Youngstown, O., has resigned. Mr. O'Deay is engaged in promoting a new project.

Harry W. Armstrong, superintendent of the Verona Tool Works, Verona, Pa., for the past 20 years, retires this week. It is probable that Harry S. Paul, president of the company, will assume charge of the works.

A tower and a complete chime of bells have been presented to Grace Episcopal Church, Chicago, by R. Floyd Clinch, of Crerar, Clinch & Co., pig iron, coal and coke merchants of that city. The chimes were rung for the first time on Christmas day, and the dedication ceremonies were conducted on the following Sunday by Bishops McLaren and Anderson, of Illinois.

Veryl Preston, of New York, formerly vice-president of the American Steel Hoop Co., who was seriously injured in an automobile accident at New York, is recovering.

Edgar S. Cook, president of the Warwick Iron Co., Pottstown, Pa., has sailed for Europe. He will visit France, Germany, England and Belgium, and will probably be abroad until summer. Meantime N. B. Wittman, formerly manager of the E. & G. Brooke Iron Co., will be acting general manager, assisted by Mr. Cook's son.

Mr. W. L. Sims, who recently resigned as general manager and treasurer of the Empire Iron & Steel Co., has accepted the general Southern agency for the Maxim boiler and water tube boiler manufactured by the Maxim Co., of Starrucca, Pa. He will have his headquarters at Birmingham, Ala.

Taking effect Jan. 1, 1902, the Pressed Steel Car Co. makes the following appointments: Geo. H. Goodell is appointed chief engineer. He has been assistant chief engineer for several months. Prior to this time he was connected with the Northern Pacific Railway in the capacity of mechanical engineer, and has also had experience in various capacities on other railroads. G. E. Moore is appointed auditor. Mr. Moore is an expert accountant, having been employed by both the Carnegie Steel Co. and the Philadelphia Company in this capacity. G. H. Judy is appointed superintendent of the McKees Rocks works. He was formerly in the Pennsylvania Railroad service, and has been in the employ of the Pressed Steel Car Co. as assistant superintendent at McKees Rocks for some months.

BLAST FURNACE EXPLOSIONS.

BY JOHN M. HARTMAN.

In the summer of 1876, while the writer was in temporary charge of the Durham Furnace, an explosion occurred that threw a bell and hopper and the stock out of the furnace, scattering the stock over the buildings and ground. The pressure of 11 pounds, then considered high, blew too hard on the cinder notch, causing the keeper to slack blast for three seconds to bot it up and then throw it on, when the explosion occurred. As usual more or less with all anthracite furnaces there was a scaffold in it, but this happening to be a large one caused a larger explosion. The furnace was 19 feet x 76 feet, a large one for that day.

The pipe stoves were attached to a receiver of double the usual size. The pressure lowered to four pounds after the scaffold fell. All furnaces have above the zone of fusion a zone of reduction, filled with disintegrated ore, limestone and fuel. Between the interstices of the fuel, ore and stone, the finely divided carbon fills up the space, forming almost a solid zone, through which the gas has to force its way upward. This finely divided carbon mostly comes from the decomposition of carbon oxide, which is pure carbon, and in its finely divided state, when red hot, is extremely explosive.

Taking a modern blast furnace, say 20 feet x 90 feet, its cubic contents will be 20,000 feet. Blowing, say, 30,000 feet per minute through the tuyeres, the furnace would be filled with air in 40 seconds from the engine. Suppose the scaffold in this modern furnace was up 18 feet, the fuel being burned away below the scaffold. There would then be free space between stock in the furnace and the space below the scaffold amounting to 4,500 cubic feet, which the engines would fill in 9 seconds. Taking 12 pounds air pressure against the scaffold, suppose it gives way, the air pressure is then released to, say, 4 pounds, when the slip occurs. Immediately the volume of air back to the blowing engine expands and the engines go quicker, the air rushes in the furnace, and not having a large body of fuel at hand to take it up and convert it to gas, free air gets into the finely divided carbon, while the mass is falling. The carbon fires explode and the furnaces becomes a huge cannon, shooting the stock out and scattering it in all directions, causing loss of life and destroying the buildings.

Taking the 20-ft. furnace with 30,000 feet of air, and supposing it to scaffold suddenly, it takes 4⅓ hours to burn out all the coke 18 feet up to the scaffold, leaving a large cavity to be filled with the scaffold and stock when it drops. Quick as the stock stops settling at the top the furnace commences to scaffold. If in one hour's time the furnace does not settle the founder must make it settle by cutting off the blast or by using dynamite. A founder will find that with a given volume of air the scaffold will commence at a certain distance up. He can have a hole in the side of the furnace at that point. Opening this hole, he can drive in a piece of gas pipe to the center, then insert the cartridge and shoot, which brings down the scaffold.

It is rarely that a second shot is required. There is a direct connection between the top and bottom of the furnace in operation. For every 30,000 feet of air entering per minute at the tuyeres, there must be 445 pounds coke entering at the top. If less coke enters, the furnace is hanging up and the deficiency must be made good when the furnace drops. After the furnace hangs up for an hour, the cavity burned in the coke becomes too large and dangerous. It must be corrected at once, as the loss of life must not be risked nor the loss of property.

Since 1876 there have been a number of explosions in the boshes of furnaces, throwing out the bells, hoppers and shooting out the stock—some of them attended with loss of life. This form of explosion must not be confounded with a gas explosion at the top, which throws out the bell and hopper but no stock. When these bosh explosions occur and the men are near the top, the finely divided carbon falls on them, sticks fast, burning off the skin and causing great pain. In these days of fast driving the momentary care of the furnace by one reliable man has been lost sight of. If we wish to avoid loss of life and property we must have him.

At a charcoal furnace some years ago the founder attempted to stop the gas rushing out at the open top and endangering the buildings while blowing out. He filled the top down to the flues with charcoal braize well rammed in, which formed a good plug. The furnace was blown down and a hole knocked in above the tymp, when the air rushed in, exploded the gas in the furnace, which blew out the plug at the top, scattering it in a burning condition over the buildings and burning them down. The furnace became a retort and gasometer, waiting for the air to explode it.

It is peculiar that in these days of colleges and universities there is not a chair devoted to blast furnace practice. In no department of metallurgy is there so little known and written of as the blast furnace, and in no department is there higher skill required in chemistry, mechanics and physics than in this one. In the Bessemer and open-hearth practice the material is at hand—iron and fuel; manipulation only is required. With the blast furnace the different materials are of great diversity, widely scattered, must be properly proportioned and the furnace properly handled to get a ton of pig of the exact character required.

To get the ton of pig the founder has to use, say, four tons of material of widely different qualities, while the ton of steel does not require over two tons. With our present fast driving, it has become necessary that something be done to stop the loss of life in modern furnace practice.

If young men who are to run blast furnaces are properly taught of the dangers of the furnace and better ways of handling them, the iron industry will be well repaid for the expense of the chair, but the professor must be a man who can better use a pair of hand leathers than handle kid gloves. The following is quoted:

"Heretofore young men have kept out of furnace business, as it is a dusty, dirty, hard, brain-working trade, requiring 24 hours a day of constant care, 365 days a year, and as a blast last about 1,000 days, he has but little chance for a genuine holiday."

Features of the Reid Wire Blocks.

An important improvement in wire drawing machinery has been made recently by Marcellus Reid, of Providence, R. I., and patents on it have been granted him. It is claimed that this improvement will make it possible to produce wire at 25 to 30 per cent less than heretofore. The Gilbert & Bennett Mfg. Co., of Georgetown, Conn., which is using a number of blocks made under Mr. Reid's patents, wrote recently of the results to the Gibbs-Brower Co., 150 Nassau St., New York, by whom the machinery was installed. The letter refers in particular to a number of desirable features of the Reid wire blocks, the substance of the statements being the following: The starting mechanism is such as largely to decrease the liability to breakage of wire in starting. There is a combination of stopping of block and applying the brake to the block simultaneously. The stopping or starting of the block may be effected from either side of a bench. By means of the drawout motion only one draft of the pullers is necessary to draw out sufficient wire for attaching to the block. There is thus only one puller mark and that on the extreme end of the wire. This mark is filed off when pointing for the next draft and thus there is no waste in the pulling-in. While one piece of wire is running another is drawn in, so that when the first piece is removed from the block the end of the next piece is ready to attach by simply slipping the plate into position. Thus no time is lost in starting up. The block does not require to be raised and lowered by treadle motion, the blocks standing in the same position all the time. This overcomes considerable wear and tear and adds to the life of the block. There is no trouble from the last end of the wire running under the block and coiling around the spindle, this occurrence often calling for a shut-down of the entire bench to disengage the wire. This complication cannot occur with the Reid blocks.

Joseph Wharton, of Philadelphia, who is now owner of the property, has decided to rebuild the Andover Furnace at Phillipsburg, N. J., increasing the height 10 feet, making it 85 feet, increasing the boiler capacity and building an additional stove. Work will be commenced at once and pushed to completion as rapidly as possible.

THE PLANT OF THE CONNERSVILLE BLOWER CO.

The Connersville Blower Co., Connersville, Ind., was organized in 1893 for the manufacture of rotary blowers, and at the present time makes a line of positive pressure blowers for delivering air or gas under pressure, gas exhausters for artificial gas plants, rotary cycloidal pumps for mining, drainage, irrigating and water works purposes, cycloidal water motors for developing natural water powers, producing small powers with city water pressure, for church organs, fans, etc.

At the present time there are 100 men employed at the plant; two shifts of 10 and 13 hours are operated, and this keeps the shop in action day and night throughout the week. There is nothing elaborate about the exterior of the plant and no outward indication of any attempt at the construction of a shop on other than the older and more common lines. The interior of the plant suggests another story and it would seem as though the amount that might have gone toward the addition of frills on the outside has been put freely out on the tools. These are necessarily heavy and being the production of some of the more prominent manufacturers of machine tools in the country the expense must have been equally weighty. There is no economy in any but the best tools, particularly if the product is that of a new firm and is of a kind and type to invite critical inspection; and the blower business is of this character.

The standard blower made by this company is shown in cross section in Fig. 1, the arrows indicating the direction of the impellers and the air. The engraving is on such a small scale that two errors may arise: there is in reality no contact between the impellers, or blades, or between the impellers and the surrounding case, a slight clearance existing between the parts at their nearest position. The loss by leakage past this clearance space is prevented to some extent by covering the surfaces with a coating of grease which acts as a packing. At the low pressures at which these machines are run this method gives a greater useful effect than if the parts were allowed to rub against each other and thus increase the friction of the machine. The cross section in Fig. 1 illustrates the manner in which the impellers are strongly ribbed on the inside and the supporting shafts are of ample size to give the rigidity required to maintain the parts in position under pressure. The shafts are secured by press fits

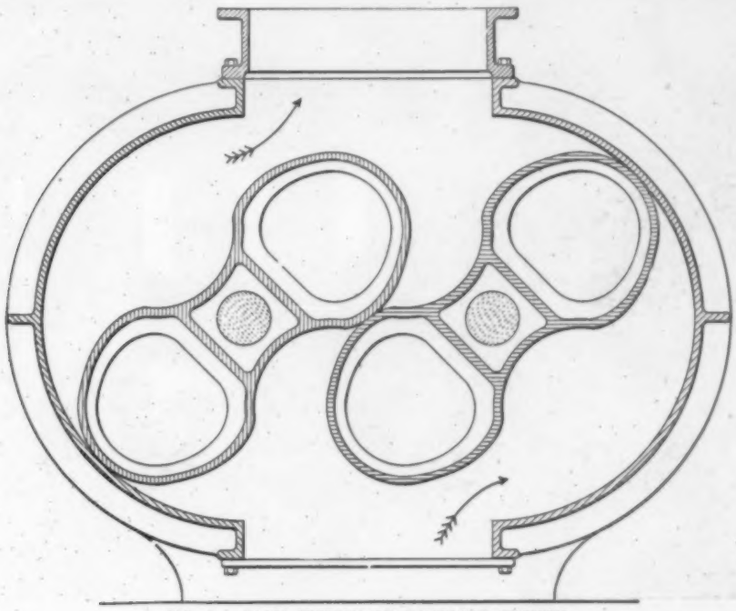


FIG. 1.—CROSS-SECTION OF STANDARD BLOWER.

FIG. 2.—PORTION OF THE MACHINE SHOP, SHOWING IMPELLERS.

in the impellers. An examination of Fig. 1 will show that the view there taken is least favorable to the blower, since the two surfaces of the impellers at their nearest points are convex. At an earlier stage or at a later portion of the rotation the adjacent surfaces would have been concave and convex, respectively, and the longer surface would be conducive to a less amount of leakage than in the former position, as illustrated in the engraving.

finishing tools which are, of course, carefully ground to the proper curvature. The machine for boring the cylinders is not shown in this illustration; it is a rugged affair specially constructed to resist the strain of a business-like cut and sufficiently stiff to produce work of the required accuracy. Some idea of the massive character of this tool may be gathered from the fact that the main bearings of the boring bar are 24x10 inches.

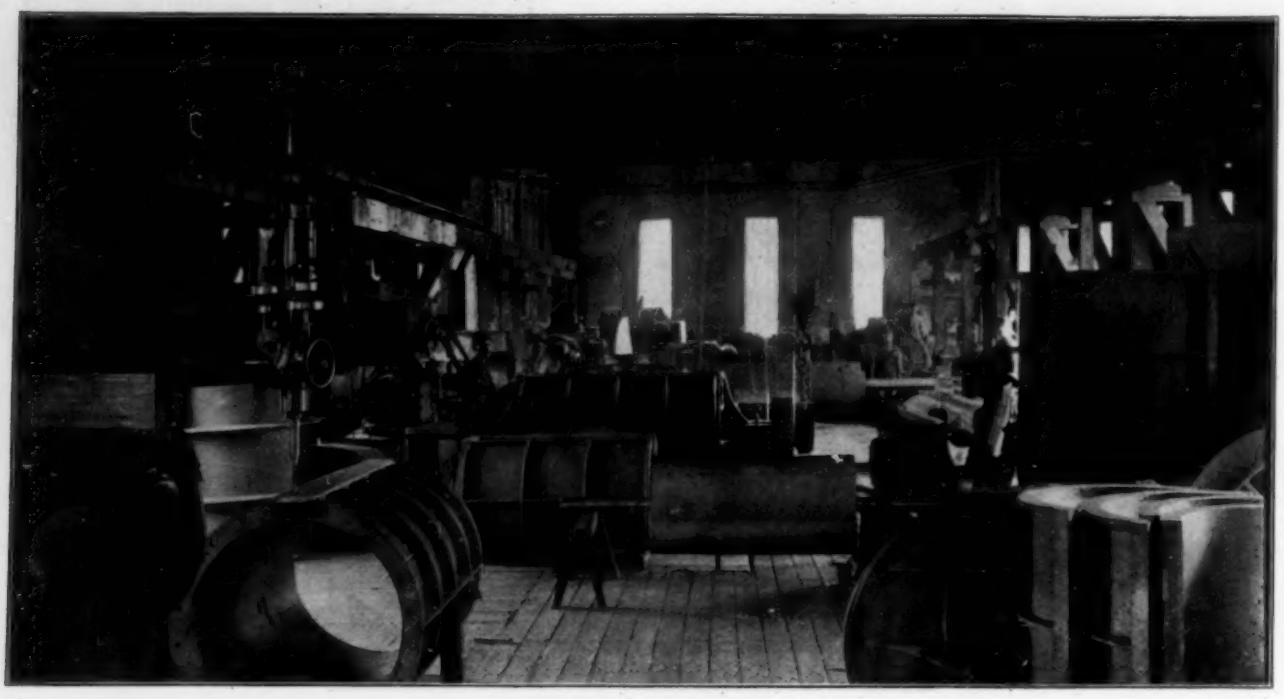


FIG 3.—PORTION OF THE ERECTING ROOM.

I had the opportunity to see one of these blowers in operation and was agreeably surprised to note the relative quietness of the machine. The absence of any sharp corners also reduces the tendency to sound vibrations at high speeds.

Some of these impellers and their supporting shafts are to be seen piled up in the view of the machine shop shown in Fig. 2. In the background to the left of the illustration is shown a 60x60-inch planer for finishing up the impellers. Another planer doing the same work is 72x72 inches x 20 feet. After the impellers are bored out and the shafts turned to size and pressed home by the hydraulic press, they are mounted on the heavy vees on the planer and planed down to a standard template. Two cuts are taken over the surface of the air impellers, good, wide chips being rolled off by the

On the same floor are the gear cutters; these are of the latest type, as all gears are cut from the solid with two cuts. On the larger work the gears are indexed by hand in preference to using the more convenient but less rigid device commonly employed for this purpose. A wedge fitting the spaces in the index wheel is held by a clamp and adjusted for each tooth. The solid connection and the certainty of the results are held to compensate amply for the slower method. The index wheels or gears were specially made for this work by an Eastern firm having a large experience in this branch of the industry, and their opinion was that the index wheels were better cut on the plan by which a worm gear blank is gashed for hobbing, by advancing the cutter along a radial line in and out of the rim, rather than cutting the spaces through

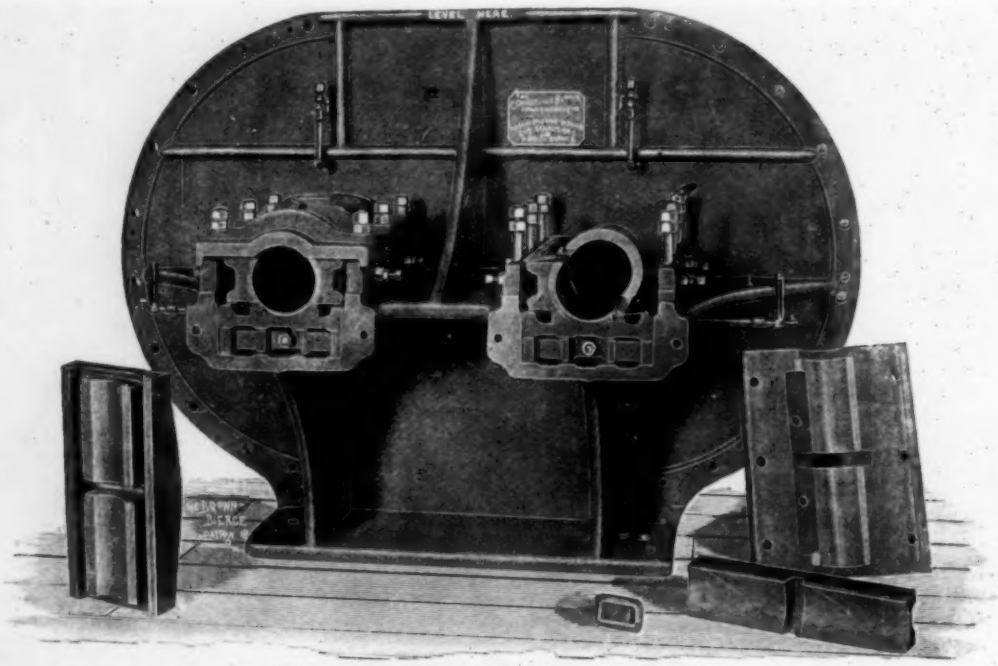


FIG. 4.—END VIEW OF BLOWER AND BEARINGS.

from side to side, as in an ordinary spur gear. This suggestion was adopted, being along the line of a greater refinement in the spacing.

The gears have a split hub which comes in very useful in the process of manufacture. Straight arbors are thus practicable for turning, etc.; in addition to this advantage the method has a further utility in permitting the gears to be slipped in position on the impeller shafts and the parts carefully adjusted. The gears are then removed and splined in readiness for the final keying together. This is of considerable value in case the blower is ever taken apart, as it will be an easy task to get the gears off the shafts after the clamping bolts are released, and for the same reason it will be equally convenient to get them together again in the correct position.

The Iron Trade Review has already commented in its columns upon the use of the steel tape in lathe work. It is thoroughly realized at the Connersville Blower Co.'s plant that that procedure is an excellent one, and all the pulleys intended to be of the same circumference are measured on the crown with a steel tape.

A portion of the erecting room is illustrated in Fig. 3. Here the castings are joined together and tested with the aid of the engine on the left of the illustration. Both in this view and that of the machine shop, attention may be directed to the crane service provided for the handling of the castings and other portions of the machinery.

The end view of the standard blower is given in Fig. 4 for the purpose of illustrating the arrangement of the bearings. The bottom and side walls of the journal boxes are cast solid with the end plates of the cylinder. The journal box shell is planed out to fit the caps and the inner parts of the bearings. Each of these is in four sections. The bottom quarter is at the left in Fig. 4 and when in position extends the full width of the retaining shell, as is evident on a comparison with the one casting in position in the bearings and the one standing on the floor. These are cored out to form an oil reservoir with return grooves. The bottoms of the castings are planed tapering towards each other, and these inclined surfaces rest upon pairs of broad tapered wedges which are machined to the same angle. These pairs of wedges are connected by an adjusting rod by which they can be drawn together to raise the journal and the bearing parts. The side quarters of the boxes rest directly on the bottom quarter and are adjusted by set screws passing through the walls of the side frame. The cap rests on these side pieces and hooks over the sides of the shell. The oil ring is made in halves and clamped tightly on the shaft; a brass shoe, or scraper, is placed on the top of one of the side quarters and the oil is gathered from the ring and spread along the shaft in a recess cored out of the under side of the cap. Scrapers at each end take the oil and deposit it in the return grooves, through which it flows back to the lower reservoir, whence it is again taken by the oil ring and the circuit commences anew. The bearings are thus flooded with oil as long as the machine is in motion.

The plant requires a number and quality of castings that could not be easily guaranteed outside the company's own supervision and therefore a foundry is operated. This is shown in Fig. 5; it is a well-lighted structure with excellent electric crane service.

The Connersville Blower Co. has taken up the manufacture of a machine that demands a better quality of workmanship than is usually accorded that line of business and is getting at it with a disregard for the nonessential features of machine manufacture that is of keen interest. Nothing has been taken on trust and this independence is evidently no bar to the progress of a very healthy business.

The company has recently built several blowers each having a capacity of 35,000 cubic feet of air per minute, and is now building more of the same size. It also has orders for six pumps, each having a capacity of 50,000 gallons per minute.

The Federal Boiler & Supply Co. has been incorporated in New Jersey with a capital of $3,500,000. An examination of the elements of the organization suggests that heater manufacturers rather than high-pressure boiler makers are mainly interested. It is announced that the new company will take over the Kellogg-Mackay-Cameron Co., of Chicago, the Kewanee Boiler Co., of Ill., the Model Heating Co. of Philadelphia, and the Uniontown Acme Radiator Co., of Uniontown, Pa. C. V. Kellogg has been elected president of the consolidated corporation. W. H. Pfahler, of the Abram Cox Stove Co., Philadelphia, is vice-president, and D. F. Baker secretary and treasurer. The directors, in addition to the three gentlemen named, are E. B. Baker, James McKay, W. A. Cameron, A. C. Mott, E. P. Mott, L. G. McCrum and A. E. Day. Although the headquarters will be in New York the company will have offices in all the prominent cities. The newly elected president announces that there will be no change in policy and that the different firms forming the new company will be conducted along the same lines as heretofore.

FIG. 5.—INTERIOR OF THE FOUNDRY.

John S. Bolton, of Moline, Ill., manufacturer of hardware specialties, has purchased all rights, stock and tools pertaining to the American post-hole digger. The concern has just occupied its new building and is well prepared to care for its growing trade.

The Alleged Decadence of the Cast Iron Car Wheel.

To the Editor:

Officials of the mechanical departments of some of our leading railroad companies are discussing the necessity of the betterment of the chilled cast iron car wheel, with a view of having it meet the universal demand for a more reliable and perfect one than they are receiving from the manufacturers at the present time. If a more satisfactory cast iron wheel cannot be produced, they tell us plainly that they intend to substitute a steel wheel for all heavy service, even should the first cost be much greater. Some of these debates have found their way into the columns of the trade journals. From them and from private sources we gather enough to recognize the necessity and propriety of an honest criticism from railroad men who are seeking the highest efficiency in their wheel service, to meet existing wants and the new conditions which are brought forward by increasing the capacity of their freight cars.

It is claimed that the present car wheel fails to satisfy all the requirements, and that it has neither the life, strength nor endurance to give general satisfaction when placed under an 80,000-pound capacity car. The pictured perfection sought by some of these individuals is thought to be within hand grasp, but they do not even dream of the reasonableness of the wheel maker's side of the question; their ideas of right and wrong seem to conflict. But when both sides find fault you have probably meted out justice.

It is further claimed that the car wheel of today is not as reliable as it was in former years, and that it has been and is still slowly degenerating year after year. If it is true that the present cast wheel is gradually passing away from its once strong, reliable and perfect state to a less perfect one, there must be some good and sufficient cause for its present unsatisfactory condition. It is plain that "what does not advance recedes." Therefore, it is true that if there is a gradual decadence the fault should be pointed out and means of betterment at once suggested, to bring it back in the best practical manner to its former standard of excellence, so that it will meet the present universal demand for a better and a longer lived wheel.

The Two Sides of the Question.

The wheel manufacturer claims that railroad companies are not paying a satisfactory price for a good, reliable and substantial wheel, made strictly in accordance with the latest and best perfected methods known to them, and that they are compelled by their agreement with railroads to remelt a large per cent of the scrap wheels as they receive them, and cast the same material into new ones to meet competition. Old wheels are quoted at $17 per ton and the new product is being bought for $22 per ton. The manufacturer receives about $1.50 per wheel in cash for each new wheel turned out—providing, however, that it meets all requirements expected from a first-class wheel made from the best material and in a workmanlike manner.

The railroad purchasing agent tells us that he is continually entreated by the manufacturers' salesmen to buy their cheap wheel, which will answer all purposes and give general satisfaction. These salesmen are always willing and ready to give the manufacturers' guarantee that his wheels will fill all requirements, and that he will furnish, without any additional expense to the railroad company, a new replacement wheel for every one of their make which fails to make the guaranteed mileage in any service in which they are placed, and is willing to take back an equal weight of scrap wheels for the new ones he furnishes.

It is a well established practice among railroad companies, when letting out their yearly contract for new wheels, to specify distinctly that the manufacturer will be obliged to take in part payment an equal weight of old scrap wheels for all new ones furnished. It is further demanded that the maker give a five-year, more or less, guarantee with each wheel, and that all new wheels be subjected to several test requirements which is not necessary to mention at this time.

Some Facts From the Inside.

Railroad companies seeking the highest efficiency in their equipment should not compel the producer to take back other makers' products, but they should insist and demand from each and every maker that he use only a small per cent of old wheels and only the highest grades of pig iron, low in sulphur and phosphorus; that the different grades should be well and thoroughly mixed in accordance with the latest and best perfected methods of modern foundry practice; that no new wheel should be regarded as satisfactory in which the phosphorus showed above 0.325 per cent; that the sulphur be kept down, and in no case be allowed to run over 0.070 per cent. Above this it hardens and makes the wheel brittle and rotten.

A new wheel, when the depth of the chill is controlled by these two elements, will not make satisfactory mileage, neither is it a safe and reliable wheel at all times. A first class wheel, if carefully made, is not necessarily high in sulphur, but after it has made its mileage on the road and returned to be again remelted with other makers' high sulphur wheels, the chances are that it picks up enough sulphur to destroy its usefulness, as this element generally increases with each remelting in the best conducted cupola practice. This continual interchange and remelting of old wheels increases the sulphur, and duplicating them into new ones without a proper proportion of new iron or without any definite regard to chemical composition is little better than a crime. There is no necessity for proving the existence of light.

Railroad companies are furnishing the wheel maker with 100 per cent of old condemned wheels from which to make their new ones. These scrap wheels represent a wheel from every Tom, Dick and Harry's make, which were doubtless bought cheap and as a natural consequence failed to make their guaranteed mileage from a faulty chemical composition.

We will ask consumers if they think it is exactly right and just to compel one producer to take back another's product and expect him to put new life, strength and durability into this material which never had any good qualities, having failed to satisfy the requirements it was bought for or intended to fill. Continuously remelting old wheels in a cupola month after month and year after year, the product has gradually degenerated by the absorption of sulphur from the fuel and other natural causes, until some wheels are at present saturated with this element and are no more reliable to remelt. A rotten apple spoils its companions. Sulphur and phosphorus are two undesirable elements in all castings, and more especially in car wheels which are intended to make a required or guaranteed mileage and are at times subjected to sudden shocks and hard usage.

Results Furnish the Real Test.

There is a certain amount of self-sustained assurance manifested among wheel makers with an established reputation, that they can produce a longer lived and a more reliable wheel than they are at present making, if they are paid a fair price for their product and allowed to use their own judgment in selecting a suitable pig iron in the open market from which to make their wheels. It must not be understood that these remarks are intended to cast any discredit on the present car wheel which must be produced cheap and under well known restrictions. The wheel maker knows how to get results but is controlled by other circumstances over which he has no control. A marine must watch the rocks and sands as well as the north star. Every practical wheel maker knows that high sulphur and high phosphorus make a hard, brittle and weak iron, and when the depth of chill is controlled by these two elements its life and strength are gone. High sulphur and high phosphorus may be two very desirable elements in some castings but not in car wheels. A cow is a useful animal in the field but we turn her out of the garden.

Experience is valuable in most places and especially at the drop where all scrap wheels are broken and carefully graded by fracture. A handful of common sense around this place is often worth a bushel of learning. A practiced eye can readily detect all high sulphur chilled wheels from those chilled by low silicon. After a critical inspection of the chill plates and other well known imperfections from which it was condemned, the sulphur contents can be readily told within a few points. From the stubble you may guess the grain.

The writer has made a practice for several years of selecting a piece of a high sulphur test-broken wheel, with the maker's name on it, and showing the defects that this element causes after the wheel has been in service a short time, until we have quite a collection of pieces from all makers with an established reputation. After having a careful analysis made from each piece, we retain it for future reference just to show that the best brewers sometimes make bad beer, and that the only way to make good wheels is to make no bad ones.

The writer was privileged to receive from a railroad official shortly after a lamentable accident occurred on his road, two complete analyses and a piece of the wheel which broke under a passenger coach while the train was running at a high rate of speed. The result was a disastrous wreck in which eight persons were killed and several others more or less seriously injured.

The following are the analyses furnished by two of the most expert railroad chemists in the country, which we will call No. 1 and No. 2:

	No. 1.	No. 2.
Total carbon	3.73	3.72
Graphite carbon	2.63	2.59
Combined carbon	1.10	1.13
Manganese	0.37	0.35
Phosphorus	0.366	0.361
Silicon	0.72	0.72
Sulphur	0.169	0.172

A prominent railroad some time ago allowed to be published in the trade papers the analyses of several wheels selected from the principal wheel makers in the country. As authority has considerable weight with some minds, we will give the three analyses as published at the time:

	No. 1.	No. 2.	No. 3.
Total carbon	3.65	3.72	3.68
Graphite carbon	2.41	3.08	2.54
Combined carbon	1.24	0.64	1.14
Manganese	0.31	0.32	0.19
Phosphorus	0.53	0.42	0.39
Silicon	0.57	0.47	0.88
Sulphur	0.16	0.16	0.16

WM. FAWCETT.

St. Charles, Mo., Dec. 23, 1901.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

I see that the A. S. M. E. has come to the rescue and put up a monument to a very remarkable man. Its one of those things that are too long delayed and when a man has been dead for nearly a hundred years the project looks on the face of it like a very tardy recognition of his worth. Take it altogether there is perhaps less need of a monument to Robert Fulton than to many others I could mention. New York has in addition to the memorial in Trinity churchyard other reminders of his name as applied to street, ferry and market in that busy corner of the world.

* * * * *

The monument to Robert Fulton was not so much a matter of importance to me as some other things suggested by the name of the man it honors. I have read all that I can get telling the story of his career, and at the distance of a hundred years the vision is not any too clear. For this reason it is not definitely settled in my mind how much of a workman in metals he may have been, but as an engineer he seems to have been a wonderful success, and being an artist and designer it is only fair to give him credit as a craftsman. He built bridges and boats, submarines and steamships, carried on his work in three countries a century ago; and international success in practical engineering in some criterion of worth nowadays, and in that day it meant much more.

* * * * *

How much more it signified is not easily estimated. I have traveled some myself and I have recollections of the tribulations of the man who got out inventions a generation ago and forced them into use. It may have been four times as difficult to get along the work at the beginning of the century and then again it may not. Estimate Fulton's efforts by the shop he had to use and the men upon whom he had to rely. The tools were few, if we count the total after subtracting those introduced in our own times.

* * * * *

He rubbed along without screw or milling machines, and for that matter probably made his own bolts and screws; with an anvil, a few files and a lathe much may be accomplished provided the rest of the equipment is in the man. The early days of the chalk era in machine shops were not noted for any great demand for interchangeable gauges, the blue print or the micrometer; there was an abundance of the philosophy which is thankful for what it does not have and keeps a keen edge on the remainder. Provided the machine would work when it was completed and the preliminary steps were of little importance; likely enough the second machine would not be wanted on the same lines, and then again it might not be wanted at all. Fulton did not have to worry about the conflicting claims between one system of screw threads and another, because he was so much ahead of the game.

* * * * *

He must have worried over the time consumed on his work; new work eats up a lot of it and perhaps the old excuses handed out now were then brand new. The material was probably far from uniform and he had no way of tackling more even stuff because it was not to be had. His reamers could have been worked out with the lathe and backed off with a file. I have seen them made that way considerably less than a century ago; maybe Fulton didn't bother with reamers, anyway. A decent hole can be made with a flat drill and a counterbore; at any rate he had to get along without a twist drill.

* * * * *

He was one of those brainy men who force success out of few opportunities, and his courage was beyond question. The recent experiments with submarine boats indicated possibilities for anxiety, but how much more these were multiplied in 1801. The crude machinery, the unlearned properties of materials, the constraint of prejudice and superstition, were handled with judgment and skill. Those of us who have labored with the embodiment of ideas in metal know how far short the reality is from the anticipated work, and the crude mechanism handled by Fulton was doubtless far from the full realization of the inventor, but it achieved a measure of success that in that generation was something marvelous.

* * * * *

The submarine boat is not so modern an idea after all, if I may credit Alan H. Burgoyne. He says that after the attempts to solve the problem by the sailors of Alexander the Great (the instruments employed by them were only watertight helmets with tubes, through which to draw air, reaching from the peak to the surface) we next hear of a submarine vessel from Bohaddin, an Arabian historian, living about 1150 A. D. This writer relates that a diver entered Ptolemais during a seige by means of a submarine apparatus. The inventor who launched a submarine boat in 1605 was Magnus Pegelius. An account of the submarine boat built by Symonds appears in the *Gentleman's Magazine* in 1747. These inventors were hampered by the lack of convenient means to get their designs into practical shape and the projects exercised no great amount of usefulness. I understand that the Nordenfeldt boats were designed by the Rev. Mr. Garrett, who built the Resurgam at Liverpool in 1879.

Interviewed last week on his return to Chicago from the meeting and inspection tour of the Colorado Fuel & Iron Co. directors, Director John W. Gates said: "We will attempt to build up the Colorado Fuel & Iron Co. and place its affairs on a sound and permanent basis. The total to be expended in improvements for this year and next year is $12,000,000. This money has already been raised, and more than 50 per cent of it is now in banks." Mr. Gates went on to say that when the new work was completed the output of the company would be 8,000,000 tons of coal, 1,500,000 tons of coke, and 600,000 tons of steel, finished in various forms, including standard and light rails, merchant iron and steel, tin plate, wire and wire-mill products.

The Pittsburg Iron Market in 1901.

BY A. O. BACKERT.

The year which has just come to a close has been an eventful one for the iron and steel industry of this district. The formation of combinations in the two preceding years, involving with but few exceptions the leading interests in this great center, proved to be but the foundation for a great combination—the United States Steel Corporation—which was launched early in the year.

During the month of January prices of iron and steel were by no means satisfactory to the manufacturer, and the announcement made by the Carnegie Steel Co., so early in the new year, that it had decided to enter the wrought pipe and tube business to find an outlet for its great production of steel foreboded a "battle of the giants." With the market on none too sound a basis, such an announcement greatly depressed business, and with rumors in general circulation that this important steel factor would invade other lines of iron and steel manufacture than those engaged in that time; consumers held off awaiting a lower level of prices. No sooner was the announcement made that the Carnegie Steel Co. would invade other lines of manufacture, than the community of interests plan was broached resulting in the formation of the United States Steel Corporation. The announcement that such a plan was on foot immediately inspired confidence in the entire iron trade and the market immediately was aroused from a condition of depression. Consumers feared that with the proposed competition done away with, values would be inflated and began buying to cover future requirements. The nine months' existence of this great combine has given indications, however, that its purpose is not to force up values, but to hold them close to a level, and to prevent if possible the alternating periods of inflation and depression from which the iron industry has suffered so much in the past.

The Steel Strike.

Next to the formation of the United States Steel Corporation, the most important event of the year was the great steel strike, declared by the Amalgamated Association after the combine was less than four months' old. The strike, instead of proving disastrous to the corporation, turned out to be the greatest mistake ever made by the union, Homestead not excepted. Instead of compelling the steel combine to yield to its unjust dictates, the association was very nearly wrecked. It has been frequently stated that it was due to the great strength of the corporation that the strike was won, but such was not the case. The strike was declared for the enforcement of wrong principles and the day it became effective the defeat of the association was assured.

Despite the formation of the United States Steel Corporation, which resulted in a new working basis for all the steel combines, and the great steel strike with its curtailment of production, the past year has been the greatest in the iron trade of this country. The production, with the exception of the strike period, was at an enormous and unprecedented rate, and the consumption was likewise stupendous. With the output of the mills, not only of this district but throughout the country constantly increasing, it was the general impression in the trade that only by corralling the markets of the world could such a great production be disposed of. Instead, the foreign trade steadily fell off, owing to periods of depression in England and Germany, and nearly all the country's production has been consumed at home. The outlook for the ensuing year is even more promising, and both production and consumption in 1902 promise to eclipse all previous records.

The Course of Prices.

That the formation of the United States Steel Corporation has resulted in a more level basis of values for all iron and steel commodities, a brief perusal of the price variations during the year will indicate. In Bessemer iron the average Pittsburg price has been $16 per ton, although there were periods in the year when but for the influence of this corporation prices would have been greatly inflated. The situation in steel billets is abnormal, owing to the fact that the billet production today is too small for the consumption and the differential between billets and Bessemer iron is too great. Steel bars and plates have also been placed on a basis giving the manufacturer a fair profit, and insuring the consumer against violent changes of values. The price of tin plate remained unchanged throughout the entire year, while merchant pipe, tubing and casing were held on a satisfactory basis. Both these commodities were greatly advanced in price during the strike period by independent producers. Sheets which were selling too high earlier in the year were reduced in price in July, and this basis has since been continued despite the fact that ruling quotations during the strike period made by independents and by jobbers fortunate enough to carry large stocks of sheets, were much higher than those of the American Sheet Steel Co.

Increased shipping facilities are of paramount importance to the iron and steel producers of Pittsburg district. The railroad interests entering this territory have been derelict in not providing either sufficient motive power or adequate terminals to move the great tonnage of the district. The facilities today are not much greater than they were six years ago when the tonnage amounted to only 40,000,000 tons annually. For the past year the total estimated tonnage is 73,125,000 tons, and it is predicted that within the next ten years the tonnage will reach 100,000,000 tons. That something must be done to relieve the great freight congestion which now prevents the proper operation of furnaces and mills in this district is already apparent to the railroad companies, but speedy relief is not in sight, and proper relief cannot be promised until after the terminals are practically doubled and the motive power greatly increased.

Corporate Changes.

While the United States Steel Corporation was the greatest combination of the year, smaller consolidations in the iron and steel trade were effected, indicating that from the smallest manufacturer to the largest the general belief is that the trade can be better benefited by consolidating interests than in any other way. The first of the local consolidations was the American Ingot Mold Co., which included the ingot mold departments of the Mesta Machine Co., West Homestead, Pa.; Marshall Foundry & Construction Co., Pittsburg; Wm. Yagle & Co., Ltd., Pittsburg; T. D. West Foundry Co., Sharpsville, Pa., and J. E. Thomas, Newark, O. Following this combination the United Engineering & Foundry Co., of Pittsburg, was formed. While half dozen manufacturers of rolls and rolling mill machinery were to have been included in the combination only four plants were absorbed. They are as follows: McGill & Co., Frank-Kneeland Machine Co. and the Lincoln Foundry Co., of Pittsburg, and the Lloyd Booth Co., of Youngstown, O. There has been much talk about organizing a combination to include all the large outside iron and steel interests of the country, but there is little chance that it will ever be accomplished.

With the organization of the United States Steel Corporation, Pittsburg has become more of an important center of the iron and steel industry of this country than ever before. The operating departments of the National Steel Co., Shelby Steel Tube Co., American Tin Plate Co., and the American Sheet Steel Co. have all been removed to Pittsburg. The headquarters of the American Steel Hoop Co. and National Tube Co. have also been removed to this city during the year. Last July the operating and sales departments of the National Steel Co. and the American Steel Hoop Co. were combined with those of the Carnegie Steel Co., and it is probable that similar combinations in the sheet and tin plate trades and the merchant pipe and seamless tube lines will be perfected during the year.

Increasing Competition.

The improvements carried out and projected during the year by both the steel combine and independent interests in this district will amount to millions of dollars, and the year

has been exceedingly prolific in the formation of independent producers. In the sheet trade the number of independent mills will equal the number controlled by the American Sheet Steel Co. within less than six months. The competition in the tin plate trade is not vet very formidable, but in wire nails and wire products the competition of independent manufacturers resulted in reductions the last three months of the year, amounting to $6 or $7 a ton. In the pipe trade competition is also springing up and promises to become an important factor in the coming year's events.

The month of October goes down as the greatest steel producing month in the history of the country. All the mills of the Carnegie Steel Co. broke their records, while other plants of the United States Steel Corporation also produced steel at a rate never before equaled. The year has also contributed the greatest blast furnace output for a period of 24 hours in the history of this important practice. One of the new furnaces of the National Steel Co. at Youngstown, O., made 806 tons of pig iron in a 24-hour run early in December, breaking the best previous record by nearly 20 tons.

The outlook for the coming year is excellent all along the line. With but few exceptions manufacturers are from two to three months behind on deliveries. The foundation of the market in rails has been laid, already insuring an output of 2,000,000 tons. In structural material the mills are filled up almost throughout the month of April, while in bars, skelp, pipe and tubes, a good business for almost the entire first half is assured. The pig iron situation shows great strength and there can scarcely be any weakening of the Bessemer market short of April, while in foundry and forge iron the situation will hold strong throughout the entire first half of the year. The plate situation also promises to be exceptionally strong, as the Pressed Steel Car Co. already has nearly its entire output for the coming year contracted for.

Pig Iron.

The past year has been a prosperous one for the merchant furnaces in the Mahoning and Shenango Valleys. While prices were comparatively low early in January, there was a steady advance throughout the first half and the level reached in the summer was well maintained until the past month, when the scarcity of prompt iron resulted in advances. The year opened with Bessemer iron considerably depressed in price and small sales were made as low as $12.25 at Valley furnace. The buying movement was started in January by the Carnegie Steel Co., covering requirements for the first part of the year, contracting for 150,000 tons at $12.50 at the furnace. Other large interests followed and the sales during the month aggregated fully 215,000 tons. This greatly strengthened the market and furnaces which were idle for several months began to resume operations in February to fill the recently closed contracts. The next month prices steadily advanced to $14 per ton, delivered, Pittsburg, and additional buying by the Carnegie Steel Co. and large interests, stiffened the market to such an extent that prices went soaring, $16 and $16.25 being quoted at the furnace in the following two months. The furnaces were all nearly sold up throughout the first half of the year. Prices sagged slightly during the months of May and June, when a basis of $16 per ton, Pittsburg, was established. In July the United States Steel Corporation established a central pig iron purchasing department, through which all iron for the constituent companies of the corporation is purchased. While the buying of Bessemer during the months of August and September was comparatively light, the steel corporation made purchases on a basis of $16, Pittsburg, although outside interests succeeded in covering requirements at $15.50 to $15.75 per ton. Instead of buying for three to six months the pig iron committee of the corporation decided to cover requirements from month to month only, an arrangement not at all satisfactory to the merchant furnacemen.

With the settlement of the steel strike in September a strong demand immediately set in for Bessemer and prices were again firmly established at $16, Pittsburg. Early in October the freight congestion seriously affected the shipment of coke from the Connellsville region, not only to the furnaces in the Valleys but to the furnaces of the big steel producers in this district. In November the situation became exceedingly serious, and many furnaces were compelled to bank temporarily, owing to the coke shortage. Some relief was given the furnaces during the latter part of November and early in December, but during the past few weeks shipments have again fallen off and the production of iron both in this district and the Valleys is seriously curtailed. As a result all shipments are several months behind and prompt iron commanded a premium during the month of December, while iron for forward shipment was also advanced in price. While the United States Steel Corporation was enabled to cover its January requirements at $15.25 at the furnace, outside interests began to secure large blocks of Bessemer for shipment during the first quarter at advanced prices, and in order to be sure of its monthly requirement of merchant Bessemer, the corporation was compelled to cover for first quarter delivery at $15.75 per ton, an advance of 50 cents a ton over the basis established for merchant Bessemer less than six months ago. The year just ending finds the merchant Bessemer furnaces in a flourishing condition generally. Their entire output is sold until April 1, while considerable business is already closed for the first half of the year.

The merchant furnaces in the Mahoning and Shenango Valleys are as great a factor in the iron and steel trade of the country today as they were one year ago, and the predicted termination of their influence seems to be still far in the future. Nor has there been any alarming lessening of merchant furnaces during the year. The Alice furnace, at Sharpsville, only recently changed hands, being purchased by the Youngstown Iron Sheet & Tube Co., of Youngstown, O.

What effect additional furnace construction by independent interests will have on the merchant furnaces still remains to be seen. While it has been predicted for a number of years that the great steel interests would soon be making all the iron they require, this condition of affairs has by no means been reached as yet, despite the greatly increased furnace capacity, compared with that of a few years ago.

During the year the Carnegie Steel Co. completed its Carrie group of furnaces. The daily output ranges from 2,800 to 3,000 tons, which is without doubt the largest for any four-furnace plant in the world. Two of these furnaces are new, while the other two have been remodeled during the year. The Eliza group of four furnaces of Jones & Laughlins, Ltd., was also completed and put into operation, and the pig iron output of this company's furnaces is estimated at 12,000 tons monthly above its requirements. However, with the increased open-hearth capacity to be finished this year the company will probably again be a purchaser of Bessemer and basic iron. The furnace of the American Steel & Wire Co., on Neville Island, was also placed in operation, while the Sharon Steel Co. further increased the production of iron among steel producers by blowing in its new stack.

The Crucible Steel Co. of America has three furnaces under erection at Clairton, Pa., which will be blown in during the coming year, and an additional furnace of the National Tube Co. will be blown in at Wheeling, W. Va. The Union Steel Co., Donora, Pa., will also increase the pig iron output with the completion of a furnace shortly. At Youngstown, O., a new 600-ton stack is projected by the Youngstown Iron Sheet & Tube Co., while the Sharon Steel Co. will erect two 350-ton furnaces at Sharon. It is conservatively estimated that the pig iron producing capacity of this district has been increased during the year by more than 3,000 tons daily, while the increased output in the two Valleys is estimated at 1,500 tons per day. The annual increase in the output can be estimated at more than 1,000,000 tons in these districts alone, while the furnace capacity projected and under erection in this district at present is 2,500 tons daily, and in the Valleys, 1,300 tons per day. Thus it can be seen that the pig iron producing capacity of the Pittsburg district and the Mahoning and Shenango Valleys is increasing at an enormous rate. It is estimated that at the end of 1902 it will be more than 2,000,000 tons greater than that of two years ago.

All grades of foundry iron have maintained a fair level throughout the year. Early in 1901 prices were somewhat higher for No. 2, than Bessemer was then commanding, but the disparity soon disappeared when Bessemer was selling at its proper level. Until November prices hovered between $14

and $15 per ton for No. 2, but the curtailment of production due to the shortage in the coke supply has resulted in advanced prices and for prompt delivery No. 2 iron is commanding almost the same price as Bessemer. Throughout the year there has been steady buying of foundry iron and the outlook for the coming year is much better than it was one year ago. Furnaces are pretty well sold up throughout the first half, and conditions point to an advancing market. With the exception of the Clinton Iron & Steel Co., there has been no increase in the output of foundry iron by any of the furnaces in this district or the Mahoning and Shenango Valleys. The Clinton stack was practically rebuilt during the year and the output was materially increased. Both gray forge and basic irons are selling nearly $2 per ton higher than was the case one year ago, and the demand for both products throughout the year was excellent. So great has been the call for basic iron at various periods during the year that plants in this district were compelled to buy their iron from Eastern furnaces, as the production of basic iron in the Valleys is far below the demand from tributary steel works.

Early in 1901 the railroads made a concession on pig iron tariffs between Youngstown and Pittsburg, reducing the rate from 90 cents to 75 cents. An effort was made by the furnacemen to have the ore and coke rates likewise reduced, but this was refused. Owing to the low price of iron in January of the past year the furnace workers had their wages considerably reduced, but advances were again made when there were threats of strikes, and a better feeling pervaded the pig iron trade. In the fall months of the year the blast furnace workers formed a national organization and the Valleys are particularly well represented.

The year just closing finds many of the furnaces with only a moderate ore supply on hand, and this coupled with the coke situation may result in the blowing out of a number of furnaces within the next few months.

Billets and Sheet Bars.

Billets, sheet and tin bars have had a wide range of values during the year and quotations at the end of the year are from $8 to $9 per ton above those ruling during its early months. An agreement price of $19.75 per ton on Bessemer billets ruled until April, when the price was advanced to $24 per ton. The scarcity of all kinds of steel became noticeable as early as February, and premiums of $1 to $2 per ton were paid to secure prompt shipment. Prices kept steadily advancing until April, when following the upward trend of the market the steel makers fixed the price of 4x4 Bessemer billets at $24 per ton. With the constantly increasing demand for sheet and tin bars on the part of independent sheet and tin plate manufacturers, prices of both these commodities ruled exceedingly high throughout almost the entire first half of the year, sales having been made at $28 and $29 per ton. While the steel strike was on the consumption of sheet and tin bars by the plants of the American Tin Plate Co. and the American Sheet Steel Co. was greatly curtailed and prices eased off somewhat, owing to the ability of the corporation to supply independent mills. Immediately following the close of the steel strike, however, the scarcity of all kinds of steel became very pronounced, and for immediate delivery sheet bars sold as high as $30 and $31 per ton, while Bessemer billets commanded $28 per ton. From an independent consumer's standpoint the steel situation at the close of the year is critical, and the only salvation for the mills seems to be the erection of their own steel producing plants a policy that is being carried out by the large outside steel interests. The United States Steel Corporation is now consuming practically its entire steel production, and plans are under consideration for increasing the steel output during the coming year. The agreed price on Bessemer billets is still $24 per ton, but it is no longer a factor in the trade. The scarcity of steel resulted in the importation of German sheet bars and small billets early in November. The United States Steel Corporation could not come to the relief of the independent consumers, although desiring to prevent the importation of this material. As long as German steel continues to rule low and American material high and scarce, it is probable that the importation of steel will continue. The wire rod market, while showing strength the greater part of the year, was considerably affected when two large and important competitors entered the field early in July. The Union Steel Co. at that time placed its rod mill in operation, as well as Jones & Laughlins, Ltd., and the rod market has since been on a basis of $32 to $33 per ton.

Bars.

Manufacturers of iron and steel bars have had an excellent demand for their products through the entire year. While the new year opened with both iron and steel bars on a comparatively low basis, heavy buying in February and March for delivery throughout the first half of the year resulted in advances of about $4 per ton. By agreement the selling price of steel bars was fixed at 1.40c, Pittsburg, in May, and in June and July heavy buying for the second half of the year set in. The buying, in fact, was the heaviest in the history of the trade, and during the months of August and September premiums were paid of several dollars per ton to secure prompt deliveries. The production was also curtailed, owing to the closing of the mills of the American Steel Hoop Co., due to the steel strike, and later the agreed prices were again advanced to 1.50c, where they have since remained. The price of bar iron, by agreement, was advanced to 1.55c, Pittsburg, but in November was reduced to 1.50c, Pittsburg. All the iron and steel bar manufacturers are several months behind on deliveries, and the outlook for the ensuing year is excellent. The completion of a merchant bar mill at the Duquense plant of the Carnegie Steel Co. has greatly increased the bar producing capacity of the country, but as yet prices have not been affected.

Tank Plates.

There have been only two advances during the year in plates, showing the stability of the market, especially since the formation of the United States Steel Corporation. Early in the year, tank plates were selling at 1.40c. An advance of $2 per ton followed, and in April another advance of $2 per ton was made. Since that time no changes in prices have followed, and with the 1.60c, Pittsburg, basis established, it is altogether probable that prices will be maintained at this figure. During the summer months the plate mills of the country were comfortably filled with business for future delivery, but with a falling off in demand in October and November nearly all were in a position to make deliveries within a few weeks. During the month of December a better demand set in, however, the lake shipyards contributing largely to it, and the outlook for the coming year is good. The demand for plates to be used in steel cars will be greater in the coming year than ever before in the history of the country. An effort in November to consolidate the four plate mills in the Eastern Pennsylvania district fell through, owing to the failure to adjust some of the details. The competition in the East is particularly strong, and another plate mill at Conshohocken will increase this competition the coming year.

Ferro-Manganese.

The importation of German ferro-manganese resulted in a reduction of manganese during the year of $10 per ton. The year opened with manganese selling at $62.50 per ton, but offerings of the German product at much lower prices gradually forced down the price of the domestic product.

Wire and Wire Nails

The influx of a large number of independent manufacturers of wire and wire nails completely unsettled this market the last three months of the year, and prices have fallen from 25 cents to 30 cents per keg. Wire products have also suffered in proportion to the reduction in wire nails. The Union Steel Co. and the Sharon Steel Co. are the largest Central Western producers outside of the American Steel & Wire Co., although the latter is believed to have a working agreement with the wire nail combination. The Pittsburg Steel Co. will also soon be a large competitor in the wire and wire nail field, and the capacity of the mills today is much greater than the country's consumption. The Hartman Mfg. Co., of New Castle, Pa., also had great additions in view for increasing its output of wire and nails, but the appointment of a receiver recently has resulted in annulling all contemplated improvements and enlargements, temporarily at least. The cut nail market has fluctuated very little, and despite the keen

competition of the wire nail the cut nail manufacturers have been enabled to hold to their monthly agreements throughout the year. While there was a difference in price early in the year between wire and cut nails of 30 cents per keg, at present they are on about the same basis.

The year 1901 will go down in history as the greatest the structural material manufacturers of the country ever knew. The building done in all the large centers of the country, and especially in Pittsburg, reached new high records, and the outlook is so good that the consumption in 1902 promises to eclipse that of the year just closed. The railroads have been especially active in the construction of new bridges, and the reconstruction of old ones, and an enormous tonnage was used up in this way. In addition the foreign demand for structural work has been very large, much work being done in Africa and Japan by the American Bridge Co. The year closes with the structural mills of the country all filled with orders running almost through the month of April. Deliveries are from three to four months behind, and material for prompt shipment commands good premiums. During the year Jones & Laughlins, Ltd., placed in operation a new beam mill, while the Carnegie Steel Co. decided on the erection of a new angle mill with an output of about 12,000 tons a month, which will be completed early in the summer. There has been but one advance in the price of structural material in the entire year. This became effective in the last week in March, and only amounted to $2 per ton, being from 1.50c to 1.60c, Pittsburg. In all lines of iron and steel material there were periods in the year when advances were undeniably proper, the demand and consumption taken into consideration. The manufacturers, however, insisted that the market should be kept steady even in the face of abnormal demand. Early in December the agreement among the structural material manufacturers was renewed for another year, and considerable pressure was brought to bear to advance prices. The leading interest, however, was against any advance, believing that consumption would be stimulated by continuing former quotations, which was done.

AVERAGE MONTHLY PRICES OF IRON AND STEEL AT PITTSBURG, 1901.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer Pig Iron	$13.25	$13 60	$16.60	$16.75	$16 75	$16.00	$16 00	$15.90	$15.75	$16 00	$16 10	$16 35
Gray Forge Iron	14.00	14.00	14 50	14.50	14.25	14.00	13.75	13.50	13.50	14.00	14 50	14.75
No. 2 Foundry Iron, Northern	14.00	14.25	15 00	15.25	15.00	14.50	14.00	14.00	14.25	14.75	15.50	16.00
Bessemer Billets, 4 x 4"	19.75	19.75	21.00	24 00	24.25	24.50	24 25	24.50	24 25	27 00	28.00	27.75
Steel Bars	1.25c	1.30c	1 45c	1.50c	1 .0c	1.40c	1.40c	1.50c	1 50c	1.50c	1 50c	1 50c
Muck Bar	25.00	26.00	27.50	27.50	27.50	28 00	30 00	31 .0	31.00	29.25	29.50	29 2
Tank Plate	1.40c	1.40c	1.50c	1 60c	1.60c	1.6cc	1.60c	1 60c	1.60c	1.60c	1.60c	1.60c
Sheets No. 28	2.95c	3 05c	3 35c	3.35c	3.35c	3 35c	3 5oc	3.75c	3.50c	3.10c	3.10c	3.10c
Ferro-Manganese	62.50	62.59	62 50	58.50	58.50	58.50	55 co	55 00	55 00	53.50	53.50	$2.50
Furnace Coke at Ovens	1.75	1.75	2 00	2.00	2 00	1.85	1.75	1.75	1.75	2 00	2.00	2.00
Foundry Coke at Ovens	2.25	2.25	2.50	2.50	2.5	2.25	2.25	2.25	2.25	2.50	2 50	2.50
Wire Nails	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2 10	2 co
Cut Nails	1.95	2.00	2.co	2 00	2.00	2 00	2 00	2.00	2.05	2.05	2.05	2.05
Beams and Channels, 3 to 15 inches	1.50c	1.50c	1.52c	1.60c	1.60	1 60c	1 60c	1 60c	1 60c	1.60c	1.60c	1 60c
Iron Skelp	1.50c	1.55c	1 85c	1.85c	1.85c	1.85c	1.80c	2 00c	2.coc	2;00c	1.85c	1.80c
Steel Skelp	1 30c	1.35c	1.75c	1.75c	1.75c	1 75c	1.70c	1.85c	1.85c	1 85c	1.75c	1.70c
Rails	26.00	26 00	26.00	26.00	28.00	28 00	28.00	28 00	28 00	28.00	28 00	28 co

Wrought Pipe and Tubes.

While there has been a decided falling off in the foreign demand for merchant pipe, tubing and casing, the domestic demand has increased wonderfully, and the opening up of the Texas oil field proved to be another outlet for thousands of tons of casing. The output of the pipe and tube mills during the year is the greatest in the history of the trade, and but for the closing of some of the plants of the National Tube Co. during the steel strike, the year's record would have been phenomenal. While the demand for these products was from 15,000 to 20,000 tons per month greater than the output of the mills of the country during the spring months, prices, so far as the National Tube Co. was concerned, remained unchanged. Even during the strike period there was no advance in prices, although the jobbers and independent producers advanced prices from 25 to 35 per cent. The National Tube Co., by following out its policy of holding the market on a firm and level basis, has instilled such confidence in the trade that it will henceforth be possible to predict almost to a certainty the level of the market from one year's end to another. Considerable competition has sprung up during the year, the largest concerns being the Sharon Steel Co., Youngstown Iron Sheet & Tube Co., and the Eastern Tube Co. As the demand for tubing fell off towards the end of the year, some of the independent manufacturers, to secure business, have been making concessions, but prices are on so low a level at the present time that there will be little profit for the independent manufacturer, providing he is compelled to purchase his supply of steel in the open market. Both iron and steel skelp fluctuated considerably during the year, but are on a basis averaging $6 to $8 per ton higher than at the first of the year. Some of the largest of the new pipe manufacturers are providing their own skelp mills. In seamless tubing, despite falling off in the demand in the bicycle trade, the consumption has been greater than ever before. The automobile trade is already partly replacing the falling off in the bicycle trade and bids fair to eclipse it in the very near future. Prices also advanced during the year from 12½ to 15 per cent.

Steel Rails.

So great was the demand for rails during the past year that the mills of the country are carrying into the year 1902 fully 300,000 tons on contracts that could not be filled. The mills operated at their utmost capacity, but despite this they were unable to cope with the enormous demand. The production of the year was greater than that of any preceding, while judging from the big tonnage placed for delivery in 1902, the coming year must exceed the past in production. Prices on rails, standard sections, were firmly maintained at $26 per ton until April, when they were advanced to $28 per ton. As early as July the railroads began to make inquiry for rails for delivery the coming year, and contracts were accepted at $28 per ton, thus practically establishing this price for delivery the ensuing year, and it has since been maintained. With nearly 2,000,000 tons of rails on their books, the operation of the rail mills of the country throughout the year is insured. Jones & Laughlins, Ltd., will no doubt prove a factor in the rail trade before the end of the year, and the Tennessee Coal, Iron & Railroad Co. will attempt to look after the Southern field, with its new rail mill in the Birmingham district, to be placed in operation shortly. On the other hand the removal of the rail mill of the Lackawanna Iron & Steel Co. to Buffalo, N. Y., will, to a certain extent, curtail production for several months of the year. The demand for light rails is without parallel, and exceedingly high prices have been paid by consumers to secure fair deliveries. It is the prevailing belief among consumers that the light rail capacity of the country is not nearly large enough and should be increased, but no projects for new mills are under way at present.

Sheets.

Abnormal conditions have existed in the sheet trade throughout the entire year. The mills have constantly been from two to three months behind on their deliveries, and only during the past month have deliveries on the lighter gauges become any better. On the heavier gauges deliveries are still quite behind, owing to the fact that the capacity of the heavy sheet mills of the country is not nearly large enough to meet the demand. Until July the market had a

decided upward tendency, and although No. 28 gauge was held at 2.95c in January, an advance in February fixed the price of No. 28 gauge at 3.35c. This was continued until July 1, when a reduction was announced by the American Sheet Steel Co., fixing No. 28 gauge at 3c for lots of 500 bundles or more, and smaller lots of this gauge were selling at 3.10c. The strike in the sheet mills was declared shortly after this reduction was announced, and while the American Sheet Steel Co. adhered to its policy not to advance prices, jobbers and independent manufacturers took advantage of the situation, and sheets for prompt deliveries were quoted as high at 3.50c and 3.75c during the strike period. Small sales were even recorded as high as 4c for No. 28 gauge. When the reduction in sheets was announced to become effective July 1, the American Sheet Steel Co. also put into operation a plan to cater to the jobbing trade largely and to permit the jobber to supply the small trade. The fluctuation in galvanized sheets has not been very great, and demand continues steady. Probably no line of the iron and steel trade has been invaded to such an extent by the independent manufacturer as the sheet business. The new mills completed and placed in operation during the year are as follows: Allegheny Steel & Iron Co., Pittsburg; Laughlin Nail Co., Wheeling, W. Va.; Neal Bros., Pittsburg, Pa.; Parkersburg Iron & Steel Co., Parkersburg, W. Va.; Waukesha Sheet Steel Co., Waukesha, Wis., and an increase in the mill capacity of Zug & Co., Pittsburg. Plants under construction and partly completed are as follows: Ashland Sheet Mill Co., Ashland, Ky.; Curtis Sheet Steel & Corrugating Co., Zanesville, O.; Rolling Mill Co. of America, Connellsville, Pa.; Sharon Steel Co., Sharon, Pa.; Stark Rolling Mill Co., Canton, O.; Tuscora Steel Co., Newcomerstown, O.; West Carnegie Sheet Steel Co., Carnegie, Pa., and the Youngstown Iron Sheet & Tube Co., Youngstown, O. The number of the independent mills, when completed, will equal those owned and operated by the American Sheet Steel Co., and when the present abnormal condition has passed, it is predicted that competition will become exceedingly keen.

Tin Plates.

Throughout the entire year 1901 the American Tin Plate Co. held the price of its product at $4 per box for 100-pound coke plates. Never before has the tin plate market had such stability and prices will continue unchanged for the first half of the coming year. The only disturbing factor in the tin plate trade was the strike during the months of July, August and September, when production was almost entirely curtailed. During this period tin plate advanced from $2 to $3 per box, and independent manufacturers and jobbers in a position to supply the demand, reaped harvests. Early in the year the American Tin Plate Co. purchased the entire output of the Sharon Tin Plate Co., a formidable competitor, for a period of five years. Another important factor was the formation of the American Can Co., which it has been predicted would be absorbed by the United States Steel Corporation. Although the consumption of tin plate was large throughout the entire year, with the exception of the strike period, the output will not very much exceed that of 1900. Considerable competition is also springing up in this trade, the following mills being projected or having been placed in operation during the past year: Carnahan Tin Plate & Sheet Co., Canton, O., 6 mills; W. H. Griffiths Co., Waynesburg, Pa., 5 mills; Jackson Iron & Tin Plate Mills, Clarksburg, W. Va., 4 mills; N. & G. Taylor Co., Philadelphia, 8 mills; Pope Tin Plate Co., Steubenville, O., 12 mills; Waukesha Sheet Steel Co., Waukesha, Wis., 3 mills.

Old Material.

The old material market, with the possible exception of iron and steel rails, has not fluctuated to any great extent during the year. Prices have followed the pig iron market, with the result that there was no inflation. Steel rails sold as high as $20 per ton during the year, while iron rails commanded as high as $24. A big demand is setting in for old material owing to the increase in the number of open-hearth plants in this country, the majority of which are being erected by the independent iron and steel manufacturers to provide themselves with a supply of steel.

Coke.

The coke production of the Connellsville region for the year will be the greatest in the history of the district. It is estimated that it will not fall short of 12,000,000 tons. While the year opened with a weekly production of less than 200,000 tons, the record for weekly production was broken by an output of more than 238,000 tons. For a brief period during the summer months the production fell off somewhat, but towards the end of the year the weekly production averaged more than 230,000 tons. The car shortage during the past three months greatly interfered with the proper movement of coke from the Connellsville region and nearly a week's production is stocked at the present time. The production of ovens in the mountain region of Pennsylvania and the Masontown district for the year was also very large. Furnace coke commanded from $1.65 to $2 per ton at the oven throughout the entire year, while foundry coke commanded from $2.25 to $2.50 per ton. Outside cokes were sold at prices ranging from 25 cents to 50 cents per ton less than the above. Coke for prompt delivery has been commanding high prices for several months and the outlook for the coming year is for still higher prices.

The Alberger Condenser Co., 95 Liberty street, New York, has been organized to manufacture and sell condensing apparatus, vacuum pumping machinery and cooling towers. The apparatus has been designed especially to meet the demands of blast furnaces and steel mills, and electric lighting and railway power stations. The application of the central condensing system to large and extended plants is to be a special branch of the company's work. The general management of the company is in the hands of Louis R. Alberger, president, formerly with Henry R. Worthington, having charge of the condenser department of that company for 13 years. His associates in the new company were with Henry R. Worthington for periods of from 7 to 20 years. The vice-president, Geo. Q. Palmer, is manager of the Quintard Iron Works of New York, an old and well known concern, which will manufacture the products of the Alberger Condenser Co. Other members of the company are B. W. Pierson, secretary and treasurer; D. H. Chester and Geo. P. Symonds.

The first 8,000-h. p. unit in the new power house of the Manhattan (Elevated) Railway, in New York city, was started last week. There are to be eight of these units in all, with a normal rating of 64,000-h. p. total, corresponding to a maximum of 100,000-h. p. Each unit consists of a duplex compound engine direct-connected to a 5,000-kilowatt Westinghouse revolving-field alternator. At each end of the crankshaft, on which the generator is centrally placed, is a high-pressure and a low-pressure cylinder. The former is placed in horizontal, the latter in vertical position, both connecting rods acting on the same crank-pin. The revolving field of the generator, 32 feet in diameter, will act as flywheel. The engines were built by the E. P. Allis Co., of Milwaukee, Wis.

The Keystone Driller Co., Beaver Falls, Pa., has just completed one of the largest portable drillers ever built. It will drill 2,400 feet and in order to test the machine a well will be put down on the company's own grounds in the hope that gas may be found.

It is probable that after court proceedings are disposed of, the plant of Pattin Brothers Foundry & Machine Co., Marietta, O., will again be placed in operation with additions and improvements. The company will also be reorganized and recapitalized.

The Wm. Tod Co., Youngstown, O., has shipped one 17 and 33x36-inch horizontal cross-compound generator engine, direct connected to a 400-k. w. generator, to the Youngstown Iron Sheet & Tube Co.; one 32x48-inch Porter-Hamilton engine for the Cuyahoga Steel & Wire Co., Cuyahoga Falls, O.; and a pair of reversing mill engines, with cylinders 36x48 inches, for the Inland Steel Co. at Chicago.

The Cincinnati Punch & Shear Co., Cincinnati, O., has shipped a large punching machine to the American Frog & Switch Co., Hamilton, O. The machine weighs 23 tons, and is said to be the largest machine built by the Cincinnati company.

The Lake Superior Iron Ore Trade in 1901.

BY DWIGHT E. WOODBRIDGE.

DULUTH, Minn., Dec. 28.—The great overwhelming fact in the iron ore trade of the Lake Superior region during the past year has been the United States Steel Corporation. It would be unnecessary to say that many, probably most, in the iron trade viewed the organization of this corporation with the liveliest alarm, for every one remembers it. The reasons for this alarm are not necessary now to rehearse. They were there and they were warranted. But with the close of the year it is plain that the men at the Western end, the owners of ore lands, of mines and kindred interests, do not take the position they did then. Their alarm is over. There has never been a year in the history of the trade when there has been as active demand for ore lands and mines, and at as good prices, as have prevailed during the year that has just closed. Independents have not been frozen out, the prices of ore have not been put at a figure that compelled steel makers without mine connections to go out of business, and in a word conservatism and reason have characterized the business of the year to an extent not hitherto exceeded. Some independent vessel men may dispute this statement, but it is not of the vessel interests that I am speaking.

The mere fact of a shipment of ore during the year in excess of any previous year is nothing surprising. It has been the rule for nearly 50 years. The exceptional years have been few and have marked periods of panic during which the industries of the country have been at a low ebb. The increase for 1901 was not at all exceptional, either. From a total of 19,121,893, in 1900, to 20,737,522 tons, reckoning in the Michipicoten shipments and an estimate of 350,000 tons, all rail for 1901, is just about the increase of the year before and far less than those of any of the three years just preceding. It is quite probable, too, that it is less than the increase of 1902 will be over the year just passed.

The Mesabi Range's Increasing Percentage.

The Mesabi's percentage of increase is of the utmost moment from all points of view. It means that furnacemen are taking more and more of that ore; that they are able to handle more and more of it, with its unfavorable qualities, qualities that are, however, by no means present in all ore of the range; that it is becoming more and more the necessary resort for the steel maker, and that more and more of the steel makers are owners and operators of Mesabi mines. The percentage in 1893, the first year of important Mesabi shipments, was 10 per cent; three years later it was 29 per cent; three years more and it was 36 per cent, and now it is 44 per cent, with the probability that it may be even more than this another season. The Mesabi has this year shipped about 9,000,000 tons, more than all the lake region was able to market in 1894—eight years ago—and almost three times as much as its nearest rival, the Menominee district, did market this year. One mine of the Mesabi range has sent down the lakes this year as much ore as the whole region produced 25 years ago, while five of its mines together produced more than 5,000,000 tons. These are the Fayal with its 1,657,000 tons, the Mountain with 1,058,000 tons, the Mahoning with 800,000 tons, the Adams with 830,000 tons, the Stevenson with 600,000 tons.

The continued and emphasized decrease in the production of the Marquette range, the old standby, is of importance, as it seems to signify that the range will not again equal its maximum of 3,757,000 tons, made two years ago. The Marquette has shipped since 1855 the enormous quantity of 62,000,000 gross tons of ore, and that it is still able to produce more than 3,000,000 tons a year is a decided comment on the remarkably rich and extensive formations in the Lake ore region. There has been a slight increase in production from both the Menominee and Gogebic ranges, and the Vermillion stands about as it did two years ago, but with a slight improvement. Generally speaking there has been no particular change in the production of all the lake ranges outside the Mesabi, and what would now be done without that vast ore district is something for speculation.

A factor of the year's business that is of importance and is probably not so generally recognized as it will be later, is the shipment of considerable ore from Central Canadian fields into the United States, competing with American ores in spite of the import duty of 40 cents a ton. This shipment has been about 170,000 tons this year, and though comparatively trifling, is large enough to attract note. The mine from which this ore has come expects to double 1901 business next year, and will probably look to the United States for a market for a large share of the product. This Michipicoten range on the north side of Lake Superior has been carefully explored the past year, and the ore reserves at the single mine now opened, the Helen, have been increased very materially, it being stated that there are about 30,000,000 tons known to exist there. In addition to this one deposit the range has been traced for many miles and several other ore bodies have been located. These give promise of importance. One of them will be opened in time to make shipment in 1903. The ore of this range is, generally speaking, a hematite, hard and porous, at the Helen mine, dense and heavy at the second find. Railroads will border this range and will give access to the lake for Eastern shipment and to the Sault for furnaces being erected there.

Other explorations in Canada, carried on by several of the important mining interests of the United States and Canada, have been pushed the past year and it is now reported that some valuable finds have been made. More will be known of this next spring than now, but if the history of Canadian ore fields is repeated there will be disappointment among many.

New Ore Developments on the Mesabi.

Explorations have been very active during the entire year upon the Mesabi range, chiefly by speculators who have not been scared out by the combinations of the time. These have been fairly successful and have located much new ore. Some of it is not of a character that will commend itself to the market, while other ores are for sale, and some is excellent. The tendency is for a lowering of the standard and ores are now classed as merchantable that two years ago would have been considered valueless. But this is of a piece with the changed conditions of the day. There may be 60,000,000 to 75,000,000 tons more ore in sight on the Mesabi, in new explorations, developments and in the increased quantities shown at old mines, than there were a year ago. This is a mere opinion and probably differs from any other opinion that may be given. Following the increase in demand for ores and lands there has been an appreciation of the asking values of leaseholds and a higher royalty is asked than prevailed up to a short time ago. It is said that there have been from 100 to 150 drills at work for ore on the Mesabi range during the year, and the result, considering this number, is not great. It is probably unlikely that any very large ore bodies will be found in future explorations, for the ground has been sufficiently gone over to find any large deposits, except at the extremes of the range where the physical character of the ores is not so good.

Facilities for Easily Handling 25,000,000 Tons.

It will not be necessary to increase greatly the mining and transportation facilities of the upper lake region to move several million tons per annum more than has ever been handled up to this time. The mines have not in the past few years been pushed to make the output, and there are equipment and facilities for handling and unloading into ships of at least 25,000,000 tons a season. The mines will enter the coming shipping season with a larger reserve of ore in stock than in the past and with greater openings for rapid summer mining. There will be largely increased facilities for lake transportation also, even though the past year several million tons more might have been moved with such dispatch as had been the rule in previous years. It is generally expected on the lake that the demand from furnaces for the new year will be greater than in the last.

The shipments of ore from the several Lake Superior ranges for 1901 and for the period of their activity, varying from 48 years on the Marquette to nine upon the Mesabi, are as follows, in gross tons:

Range.	1901 shipment.	Proportion.	Total to date.
Mesabi (Minnesota).....	8,991,278	44%	40,391,355
Menominee (Michigan)...	3,369,933	16%	37,385,912
Marquette (Michigan)....	3,121,436	15%	62,724,229
Gogebic (Mich. & Wis.)..	2,888,924	14%	34,105,559
Vermillion (Minnesota)..	1,785,769	8¾%	16,976,949
Michipicoten (Canada)...	230,000	1%	292,500
All rail (estimated).....	350,000	1¼%	
Total	20,737,340	100%	192,458,824

The statement by ranges for 1901 includes the water shipments. To get the exact output of each range the all-rail shipments for the year should be added to the Gogebic, Menominee and Marquette ranges.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Michigan Wheelbarrow & Truck Co., of Saginaw, Mich., has recently built an addition to its plant—a foundry building 60x100 feet—and has put in a cupola manufactured by Byram & Co., of Detroit. In addition to its own castings the company expects to do considerable jobbing work in its foundry. It is in the market for ladles and other equipment.

The Steel Machine Co. of Woodbury, Pa., has been incorporated with $60,000 capital by H. B. Green, G. G. Green, W. G. Johnston and W. Johnston.

The Keystone Stove Foundry of Spring City, Pa., has been incorporated with $60,000 capital.

The Coatesville Iron & Steel Co. of Coatesville, Pa., has been incorporated with $5,000 capital, to operate the Kurtz mill, north of Coatesville.

At a recent meeting of the board of directors of the Youngstown Iron Sheet & Tube Co., held at Youngstown, O., the increase in the capitalization of the company from $2,000,000 to $4,000,000 was formally authorized. The offices of the company have been removed from the plant site at Haselton to the Federal Bldg., Youngstown.

The Alliance Machine Co., of Alliance, O., has been incorporated with a capital of $200,000, by W. C. Whitehead, N. T. Horr, C. L. Denton, F. R. Fuller and E. M. Forbes, all of Cleveland. The company will manufacture heavy machinery.

The W. C. Toles Co., of Chicago, has been incorporated with $50,000 capital to manufacture machinery and machine tools. W. C. Toles, E. A. Toles and H. M. St. Clair are the incorporators.

The Chicago Tin Co., of Chicago has been incorporated with $20,000 capital to manufacture tinware, by M. Geil, Aaron Edelman and Henry Cohen.

The American Wire Fence Co., of Chicago, has been incorporated with $100,000 capital to manufacture wire fencing. N. L. Clement, A. A. Clement and R. J. Kerr are the incorporators.

The George Whiting Co. of Chicago has been incorporated with $25,000 capital to manufacture machinery. George Whiting, J. H. Chamberlain and C. B. Masslich are the incorporators.

The Phœnix Iron Works of Hartford, Conn., has been incorporated with a capital of $50,000, of which $25,000 is paid in. The company purchased the plant of the Lincoln Foundry Co., and will immediately place it in operation. J. H. K. Davis, E. D. Redfield, C. L. Taylor, G. A. Fairfield, S. G. Dunham and J. H. Hall are the incorporators.

The Pringle & Brodie Machinery Co., of Chicago, has been incorporated with $25,000 capital to manufacture machinery. G. W. Pringle, William Brodie and J. C. Pirie are the incorporators.

The Advance Power & Machine Co., of Detroit, Mich., has been incorporated with $100,000 capital. E. C. Miller, F. T. Bancroft and B. T. Mulford are the incorporators.

The Oettiker Hardware Co., of Plattsville, Wis., has been incorporated with $5,000 capital. W. H. Oettiker, G. S. Butler, C. P. Smith and M. Geasland are the incorporators.

The Norwalk Steel & Iron Co., Norwalk, O., has filed articles of incorporation at Dover, Del., capital $1,000,000. The incorporators are John E. Carnahan, Canton, O., E. E. Erikson, Pittsburg, and F. Protzman, Allegheny, Pa. An open-hearth steel plant will be built.

The Faultless Mfg. Co., of Chicago, Ill., has been incorporated with $10,000 capital to manufacture stoves and ranges. Oscar Millsap, Claus Drabel and W. D. Elmer are the incorporators.

The Ornamental Iron Mfg. Co., of Indianapolis, Ind., has been incorporated with a capital of $2,000. Frank Lange, Norman O. Reid, Frank Armbout and H. N. LeClair are the incorporators.

The Pacific Hardware & Steel Co., of San Francisco, Cal., has been incorporated under the laws of New Jersey with $10,000,000 capital, divided into $7,000,000 common and $3,000,000 preferred bearing 6 per cent cumulative dividend. The company is authorized to deal in and manufacture iron and steel products and hardware. A. K. Gibbs, E. A. Selfridge, C. E. Miller, H. J. Morton, Louis Floss, Jr., A. L. Scott and Joseph Floss are the incorporators.

The Spokane Galvanized Wire Pipe Co., of Seattle, Wash., has been reorganized under the name of the Pacific Coast Pipe Co., with a capital of $100,000. L. H. Long, J. C. Ralston, H. Orlhardy, T. B. Garrison, P. E. Fisher, M. K. Lott and C. S. Eltinge are the incorporators.

The New York Radiator Co. of Utica, N. Y., is being organized by the stockholders of the Hart & Crouse Co. of the same place. A plot of eight acres has been purchased by the promoters of the company and a number of buildings will be erected to include a machine shop and a foundry. Plans for the foundry are already being prepared.

The Little Kanawha Coal & Coke Co., of Uniontown, Pa., has been incorporated with $289,600 capital to mnie coal and manufacture coke in Gilmer county, W. Va.

The Chicago Pneumatic Tool Co., the recently promoted combination of manufacturers of pneumatic tools has been incorporated under the laws of New Jersey with $7,500,000 capital.

The American Stove Co., recently incorporated in New Jersey has increased its capitalization from $100,000 to $5,000,000. The company is designed to include several well-known Western manufacturers of stoves and ranges, but as yet the promoters have not made their plans public.

The plant of the Michigan Alkali Co., Wyandotte, Mich., which was recently destroyed by fire will be rebuilt immediately. The company will receive bids for engines, boilers and air compressors for equipping the plant.

New Construction:—

The Rogers Locomotive Co., Paterson, N. J., will erect a new erecting shop 265x100 feet. It will be equipped with two powerful traveling cranes.

The Dillon Machine Co., of Dallas, Tex., is preparing to operate on a more extensive scale than heretofore and will shortly erect a new foundry and machine shop.

The Pennsylvania Railroad Co. will erect a new car wheel foundry adjoining its present shops at Altoona, Pa. It will be one of the most modern car wheel plants in the country and will cost about $500,000.

The Harrisburg Foundry & Machine Co., Harrisburg, Pa., will erect an additional building adjoining its present plant, 160 feet long, 50 feet wide and three stories high. Other improvements will be made in the equipment and these together with the new building will increase the capacity of the works fully 40 per cent.

The plant of the Exeter Machine Works, Pittston, Pa., is being greatly extended. An extension 170x30 feet is being built to the machine shop. The new buildings include a boiler shop 140x60 feet, two story office building, 60x100 feet, blacksmith shop and power house with a complete lighting plant. The machine shop will be equipped with three traveling cranes, automatic turret lathes, floor drilling machines, boring mills, etc. The boiler shop will be equipped with one electric traveling crane and full boiler building equipment. The enlarged works will have three times their present capacity and operations will be commenced in the additions about July 1.

The Thew Automatic Shovel Co., of Lorain, O., has outgrown its shop capacity and has just let a contract for a 100-ft. extension, 80 feet wide. This will increase the output and number of men employed about 50 per cent.

The Pittsburg District:—

The Simonds Mfg. Co., Pittsburg, has been in operation night and day during the past three months, owing to the large number of orders on hand. It is probable that during the present year considerable new machinery will be installed to take care of the company's constantly increasing business in the cut gear and special machinery line.

George A. Dickson, who recently resigned as manager of the Manufacturers' & Producers' Supply Co., of Pittsburg, has been elected president of the Atlantic Supply Co., and will manage the Pittsburg district for this company, with offices in the Empire building. The Atlantic Supply Co. directly represents mills manufacturing wrought iron pipe, tubing, casing and line pipe, iron and steel products, wire rope, nails, gas and

water supplies, gas and oil well supplies, babbitt metals, Parson's white brass and manganese bronze, bearing metals, etc.

The National Rolled Steel Car Co., of Pittsburg, incorporated in West Virginia some time ago, is preparing plans for the erection of a large plant in the vicinity of Pittsburg. The location has not yet been made public.

The plant of the Carnegie Tube Co., located at West Carnegie, Pa., is nearly completed. The initial capacity will be from 60 to 80 tons of ⅛ to 3-inch butt weld pipe per day.

Armin Schotte, consulting engineer of Pittsburg, is preparing plans for the new engine plant of the Bradley Mfg. Co., of Pittsburg. The works will be located on Pennsylvania Ave., Allegheny, and the main building will be 100x300 feet.

The Allegheny Steel & Iron Co., of Pittsburg, whose plant is located at Avenue, Pa., will increase its steel making capacity by the addition of another open-hearth furnace with a capacity of 50 tons daily. The sheet rolling capacity will also be materially increased. The present output of the plant is from 40 to 50 tons per day.

The new power building of the McKenna Bros. Brass Co., Ltd., on First Ave., Pittsburg, has been completed and the equipment of the plant at 218-222 Third Ave. is being removed to the new building. The new building is six stories high and cost $110,000.

Jones & Laughlin, Ltd., have notified their employes that the 1901 scale of wages will be continued throughout 1902.

The Pittsburg Friction Draught Gear Co., of Pittsburg, has been incorporated with $1,000 capital to manufacture a new coupling, the patents for which have recently been granted. W. M. Orr, W. D. Rowan, B. S. Leihart, W. A. Harbison and W. W. Woodcock are the incorporators. A plant for the manufacture of the coupling will be built in Pittsburg.

The Carnegie Steel Co. has prepared plans for the remodeling and enlargement of the armor plate department at Homestead. The large armor plate machine shop which adjoins the casting and forging department must be moved to permit of its enlargement and to allow the erection of an extension to the other departments. All of the powerful machinery in the machine shop will be carried 300 feet to a plot now occupied by the pattern and carpentry departments. The great press which has a capacity of 12,000,000 pounds, will be duplicated, the two making the largest pair of presses in the world in any one plant.

W. F. Dowerman, W. S. Evans and Q. R. Emmel will apply on Jan. 9 for a charter for the incorporation of the Dowerman Rivet and Bolt Mfg. Co. The plant will be located at 32d St. and Penn Ave. The company will manufacture rivets and bolts. Bids for the following second hand machinery will now be received by Mr. Dowerman: 80-h. p. boiler, 50 or 60-h. p. engine, lathes, planers, drill presses, shafting, pulleys, hangers, etc.

L. V. Bluey with storeroom in the Empire building, Pittsburg, representing the Wheeling Mold & Foundry Co., of Wheeling, W. Va., and the American Tool Works Co., of Cincinnati, reports that the sales of the products of the two companies have been unusually large during the past year. A large stock of machine tools is constantly carried in stock.

Tate, Jones & Co., Empire building, Pittsburg, report the following recent installations for Robbins belt conveyors: National Tube Co., Pennsylvania department; National Malleable Castings Co., Sharon, Pa., and the Davis Coal & Coke Co., Coketon, W. Va. At the present time the company is erecting a plant at Leetsdale, Pa., on a 13-acre site recently purchased.

The West and Northwest:—

J. J. Ryan & Co., brass founders and finishers, 68 to 74 West Monroe St., Chicago, report having recently signed a contract with a large Eastern concern to remelt all its old nickel purchased from time to time from its trade in exchange for new nickel. The character of the work done by Ryan & Co. on sample orders led the Eastern concern to sign the contract for all the West, Southwest and Middle States for a period of three years. Since closing this contract Ryan & Co. have found it necessary to add 5,000 square feet more to their foundry space. This is the eleventh time in the history of this firm that it has been compelled to add to its capacity to keep pace with orders. Seventeen years ago Ryan & Co. occupied a space of less than 3,000 feet; today the foundry alone comprises 26,000 square feet, certainly a remarkable career.

E. H. Sargent & Co., Chicago, dealers in chemists' and assayers' supplies, announce that they have purchased the stock and good will of Richards & Co., Ltd., of Chicago, the transfer taking place Jan. 1. This will increase considerably the stock of the company.

The National Brass Mfg. Co., Kansas City, has had plans prepared for a new plant to cost $20,000.

G. H. McCammon has been appointed Chicago representative for Walter A. Zelnicker, of St. Louis, Mo., to succeed W. H. Thompson.

The Railway Materials Co., Old Colony Bldg., Chicago, has been incorporated to manufacture the Ferguson furnace and the Ferguson heater and kindler.

F. Mertsheimer, formerly of the Kansas City Southern Railway, has opened an office at 203 New York Life Bldg., Kansas City, Mo., where he will represent the Grant Tool Co., Franklin Pa., the Lidgerwood Mfg. Co., New York; Springfield Mfg. Co., Springfield, Mass.; Atlantic Works, Philadelphia, Pa., and the Ames Iron Works, Oswego, N. Y.

The Modern Iron Works, Quincy, Ill., has been incorporated with a capital of $40,000 to do a general foundry and machine shop business. The incorporators are B. Vernon Clark, George Fischer and August J. Niemeyer.

The Ransom Mfg. Co., Oshkosh, Wis., recently organized with a capital stock of $25,000, has succeeded to the business of Perry Ransom, of the same city, manufacturer of machinery and tools.

The Beall Shovel Co., Alton, Ill., is reported as considering the erection of a rolling mill.

The Chandler Pump Co., Cedar Rapids, Ia., is having plans prepared for a foundry, 200 feet long, which it will erect in the spring.

Schickle, Harrison & Howard Iron Co., St. Louis, Mo., has increased its capital stock from $1,000,000 to $2,500,000.

The American Brake Shoe Co. Old Colony Bldg., Chicago, is distributing as a Christmas souvenir a bronze medal, recording the fact that it has received the highest awards for brake shoes made under its patents, at Chicago, in 1884, Chicago in 1893, and Paris in 1900.

Joseph T. Ryerson & Son, Chicago, iron merchants and special agents, awarded several weeks since contracts for additional warehouses which they are erecting in the western part of the city. The new buildings will occupy a space about 250 feet square. They will be of the heaviest steel warehouse construction, designed for carrying heavy loads of steel merchandise. It is the intention of the company to add greatly to the lines already handled as soon as the enlarged space in the new warehouses will give the needed facilities. Principal among the new lines to be added, are structural and bar steel, which will be carried in stock. The new building will be equipped with electric cranes, cold saws and other machinery for handling and cutting structural and other steel to size and length. The building is arranged so that switch tracks connecting with all the trunk lines enter the building, permitting the loading and unloading of products from the cars. The present Ryerson warehouses at Milwaukee Ave., Lake and Clinton Sts., Chicago, consist of buildings five story and basement covering an area of approximately 150x180 feet. These warehouses together with the additions referred to, will give the company a storage capacity of approximately 125,000 tons of iron and steel products.

The Avery Mfg. Co., Peoria, Ill., has installed a new sprinkling system in connection with which it is building a 400,000 gallon reservoir. Additions to the plant just completed are a new wing to the main building, as an extension to the paint shop, an engine and separator warehouse, 28x480, an engine erecting room, 16x140, having sufficient room and facilities for erecting 21 engines at a time, and an extension on the foundry, 32x70 feet.

The Kingman Plow Co., Peoria, Ill., has issued a letter to the trade, in which it states that it has decided not to become a part of the American Plow Co.

The American Hoist & Derrick Co., St. Paul, Minn., is having plans prepared for a four-story addition, 40x60, to cost $15,000.

The American Foundry Co., Indianapolis, Ind., will be

incorporated with a capital stock of $20,000, and will erect a foundry on Harris Ave. in Mount Jackson. Frank C. Schwoerer, William H. Orcutt, and others, are interested in the concern.

It is reported that M. J. Gleason will build a brass foundry in Richmond, Ind.

It is reported the Ohio Falls Iron Co. will build a puddling mill, bar mill and a light rail mill at New Albany, Ind.

The Charles A. Stickney Co., St. Paul, Minn., manufacturer of gas and gasoline engines, is enlarging its foundry by an addition 26x20 feet. E. E. Johnson, formerly of Henion & Hubbell, Chicago, has been made superintendent of the engineering department of the company.

The Wisconsin Machinery & Mfg. Co., Milwaukee, Wis., has been incorporated with a capital of $25,000. The new company will succeed to the business of the Wisconsin Machinery Co., formerly conducted by Louis E. Vogel. The officers elected are as follows: William H. Vogel, president: J. W. Otto, vice-president; and Louis E. Vogel, secretary and treasurer.

The Berlin Machine Works, Beloit, Wis., will erect a machine shop 200x200 feet.

The plant of the Marine Iron Works, Chicago, recently destroyed by fire, will be entirely rebuilt. The buildings will include a machine shop, two stories high, 110 feet long and 40 feet wide, a one-story and two-story structure 50x182 feet for pipe shop and offices, and a two-story boiler house 62x64 feet.

Fires and Accidents:—

The Supply Mfg. Co. and the Reliance Pattern Works plants, Pittsburg, were damaged to the extent of $5,000 by a recent fire.

Fire damaged the machine shop and foundry of Kruecke Bros.' Mfg. Co., Milwaukee, Wis., to the extent of $2,500.

Fire practically destroyed the Island Foundry at Mechanicsville, N. Y.; loss, $40,000.

The plant of the Graham Machine Co., Rochester, N. Y., was destroyed by fire last week, with a loss of $100,000.

Three men lost their lives in a fire at the furnace of the Sharon Steel Co., South Sharon, Pa., last week.

General Industrial Notes:—

The Penn Bridge Co., Beaver Falls, Pa., has been awarded the contract for the construction of two bridges across Sugar Creek, Bradford county, Pa., at a cost of $26,810.

The plant of the Valentine Iron Co., Bellefonte, Pa., including furnace, rolling mill and ore lands, was sold to the Commonwealth Trust & Guarantee Co., of Harrisburg, Pa., last week for the sum of $86,000. It is probable that the plant will shortly be placed in operation.

The Whiting Foundry Equipment Co., Harvey, Ill., report the following orders recently closed for complete foundry equipment: Bessemer Gas Engine Co., Grove City, Pa.; American Drilling Tool Co., Parkersburg, W. Va.; LaBelle Steel Works, Steubenville, O.; British Westinghouse Electric & Mfg. Co., Manchester, Eng.

The Bethlehem Steel Co., of South Bethlehem, Pa., has just been awarded a contract for the construction of the largest eye bar machine ever built. It will have a capacity for making 16-inch eye bars. The order was placed by the American Bridge Co. Two bridge contracts recently closed by this company for bridges over the Monongahela and Ohio rivers for the Wabash railroad call for 14-inch eye bars with a 32-inch head.

The Petroleum Iron Works, Washington, Pa., is at present filling orders for tank work for shipment to London for installation in British refineries, where Texas crude oil is to be treated.

The Lukens Iron & Steel Co., Coatesville, Pa., has recently acquired additional warehouse facilities at New Orleans, where the company now conducts a large depot.

The foundry of the Carbondale Metal Works, Carbondale, Pa., is fast nearing completion and will soon be placed in full operation.

The Michigan Stove Co., Detroit, Mich., has increased its capital from $300,000 to $3,000,000.

The Marion Steam Shovel Co., Marion, O., has received an order from the Ohio Iron & Steel Co., Lowellville, O., for a 75-ton steam shovel.

THE "DURO" BLOW-OFF VALVE.

The general form of this new valve is quite similar to the iron body angle blow-off valve, which has been so extensively used for some years past. There is, however, an important difference in the design. In the old construction the seat was so located that as the disc closed the opening there would be an accumulation of scale and sediment, and the effect would be to cut out the bearing surfaces to such an extent that in a short time the valve would become leaky. Various improvements have been devised so that the disc would fit tightly in the valve body, with the object of preventing the scale from passing on to the seat after the disc had cut off the inlet. This method is not wholly satisfactory, as the valve body would soon wear, and in a short time permit the passage of scale and sediment. The distinguishing features of the valve under consideration are that the plug fits snugly in a separate and easily removable bronze casing, which can be readily replaced when worn, and any accumulation of scale is prevented by a jet of steam blowing across the seat.

Fig. 1 is an elevation of the "Duro" blow-off valve, with tapped connections, while Fig. 2 shows the flanged type, the two being identical in all other respects.

It will be noticed on reference to the illustrations that there is a steam inlet A and on the section cut, it will be seen that this connects with an annular passage C. The iron body of the valve has a brass casing D with a circular slot J just

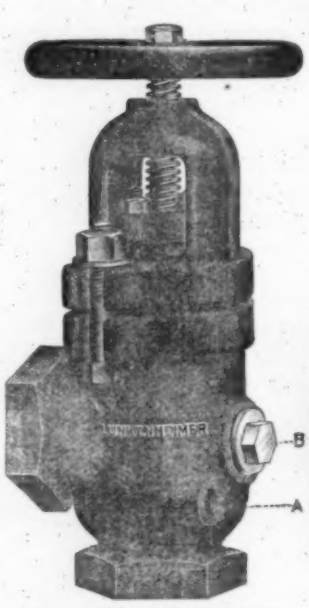


FIG. 1.—ELEVATION OF THE "DURO" BLOW-OFF VALVE

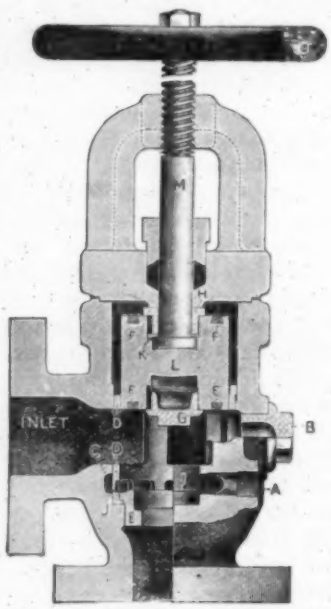
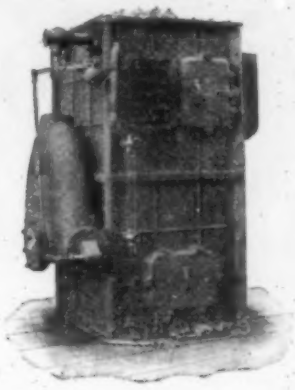


FIG. 2.—SECTIONAL ELEVATION OF THE "DURO" BLOW-OFF VALVE.

below the level of the seat E. This casing D is held in place in the valve body by the seat ring E, and the opening A is piped to the boiler and supplied with a valve. The object of this inlet A is to admit steam to C and J, and discharging from the latter blow over the seat.

When closing the "Duro" blow-off valve the disc is screwed down in the usual manner. As it approaches the level of the inlet, the edge of the disc passing the lower edge of the casing D cuts off a great deal of the flow of water and sediment, etc. At this time the valve in the steam pipe leading to the inlet A should be opened and the steam admitted to the annular space C, from whence it passes through the slot J and blows off the entire surface of the seat E. Meantime the disc is being screwed home to the seat, cutting off the flow of steam from the inlet A as well as the blow-off from the boiler. The valve in the pipe leading to the inlet A can be left open, as the disc would keep this outlet closed. The disc is reversible, having two valve or seating faces, which can be changed at will, thereby increasing the durability and efficiency of the valve. These seating faces in the disc consist of dovetailed slots, which are filled with babbitt metal, and when both are cut or worn out the babbitt metal may be melted out and new metal poured into the slots. The wearing portion of the disc is then renewed by simply facing off the new babbitt. A plug B is provided opposite the inlet, so that if desired this can be taken out and a rod introduced to clean out the blow-off pipe.

The "Duro" blow-off valve has been recently added to the list of specialities manufactured by the Lunkenheimer Co. of Cincinnati, O.



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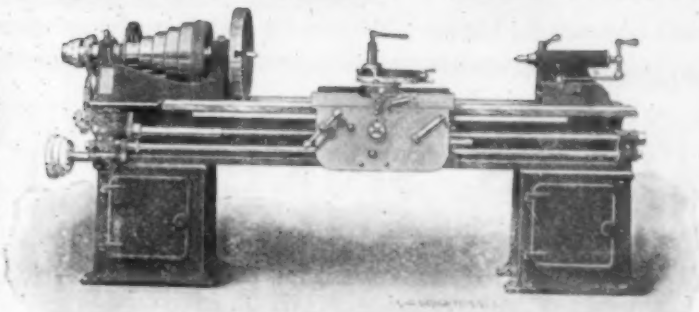

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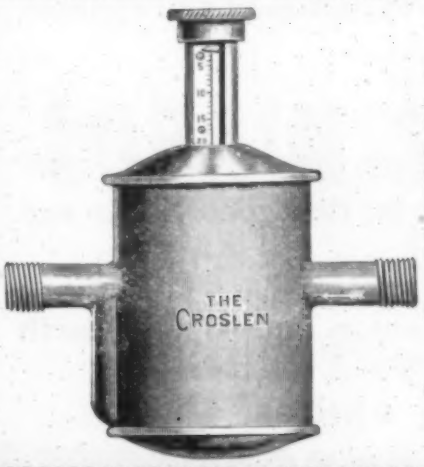

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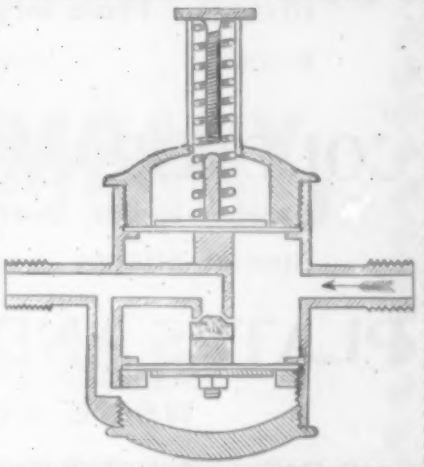

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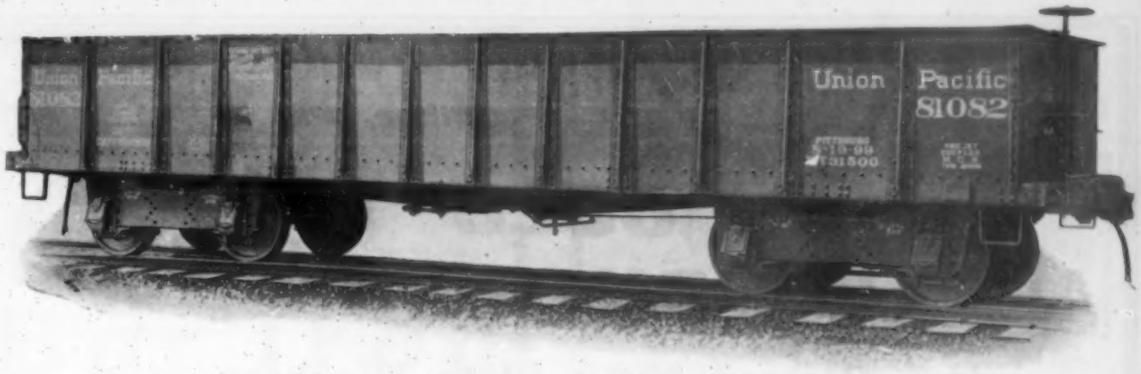

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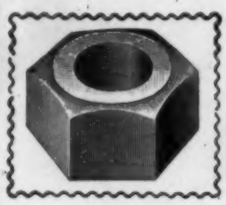

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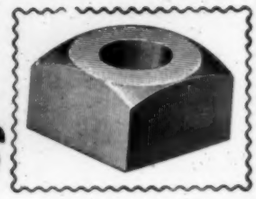

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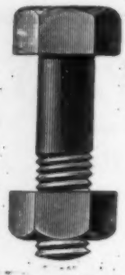

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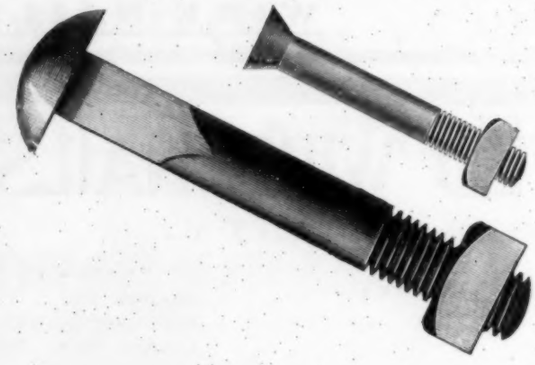

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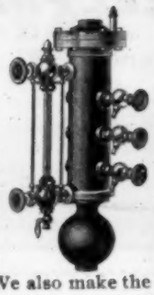

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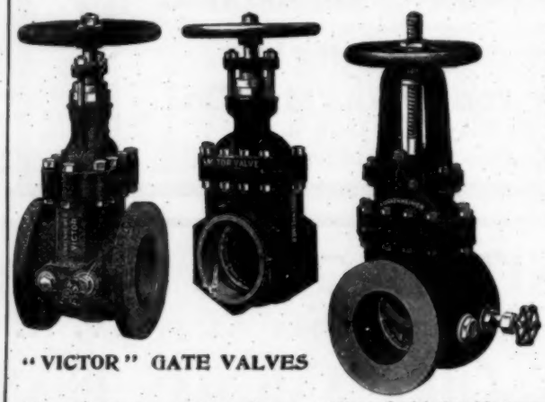

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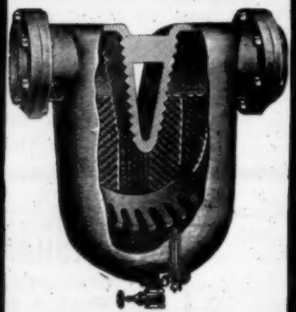

Fig. B. HORIZONTAL.

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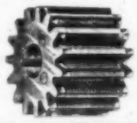

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